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IN THE

Supreme Court of the United States

OCTOBER TERM, 1977

No. –

LAHMAN MANUFACTURING COMPANY, INC., and ROBERT ANDERSON, d/b/a PLATTE IMPLEMENT,

Petitioners,

vs.

FARMHAND, INC.

Respondent.

APPENDIX FOR
PETITION FOR WRIT OF CERTIORARI TO
THE UNITED STATES COURT OF APPEALS
FOR THE EIGHTH CIRCUIT

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A District Court Opinion after trial 192 USPQ 749 (DCSD 1976)

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District Court, D. South Dakota, Southern Div.

Farmhand, Inc.
v. Lahman Manufacturing Company, Inc., et al.
No. Civ. 73-4037
Decided Sept. 27, 1976

PATENTS

1. Patentability — In general (§51.01)

Requirements for patentability of invention are set out in 35 U.S.C. 101-103; to be patentable, invention must be useful, novel, and nonobvious with respect to prior art; all three of these requirements must be met by valid patent.

2. Pleading and practice in courts — Burden of proof — Validity (§53.138)

Presumption from patent grant — In general (§55.1)

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[9] For another example of "family" marks, see Procter & Gamble Co. v. Conway, 419 F.2d 1332, 164 USPQ 301 (C.C.P.A. 1970) (registration denied to "Mister Stain" on the grounds of likely confusion with "Mr. Clean," "Mr. Clear," "Mr. Sheen," "Lady Clean," and "Mrs. Clean").

Presumption from patent grant — Weight of (§55.9)

All patents carry rebuttable presumption of validity when issued, and burden of establishing invalidity rests on party asserting it; invalidity of patent must be shown by substantial evidence, not merely preponderance; party asserting patent invalidity must not only overcome statutory presumption of validity, but must also rebut whatever proof patentee offers in defense of validity of his claim.

3. Patentability — Anticipation — In general (§51.201)

Patentability — Anticipation — Prior knowledge, use or sale (§51.223)

Unlike defense under Section 102(a) where prior knowledge and use must be "public" at time patented invention is made, prior invention under Section 102(g) requires only that invention be complete, i.e., conceived and reduced to practice, and not abandoned, suppressed or concealed.

4. Interference — Reduction to practice — In general (§41.751)

Patentability — Anticipation — Experiments (§51.209)

Another's experiment, imperfect and never perfected, will not serve either as anticipation or as part of prior art, for it has not served to enrich it; patented invention does not become "known" by such use or sale, or by anything of which art cannot take hold and make use as it stands; reduction to practice contemplates actual and complete use of particular invention for its intended purpose.

5. Abandonment — In general (§10.1)

Interference — Priority (§41.70)

Patentability — Anticipation — In general (§51.201)

Patentability — Anticipation — Prior knowledge, use or sale (§51.223)

Section 102(g) requires that invention not be "abandoned, suppressed, or concealed"; invention, although completed is deemed abandoned, suppressed, or concealed if, within reasonable time after completion, no steps are taken to make invention publicly known.

6. Patentability — Anticipation — Experiments (§51.209)

Patentability — Anticipation — Prior knowledge, use or sale (§51.223)

Section 102(a) requires that any prior use must have been "public"; experimental use is not public use within meaning of this section.

7. Patentability — Anticipation — Experiments (§51.209)

Patentability — Anticipation — Prior knowledge, use or sale (§51.223)

Mere fact that attempt to get device to work was not concealed does not make use public within meaning of Section 102(a).

8. Patentability — Anticipation — In general (§51.201)

Patentability — Invention — In general (§51.501)

All elements of invention or their equivalents must be found in single description or structure where they do substantially same work in substantially same way, in order to negative novelty or anticipate invention; while prior art can be combined to demonstrate obviousness under Section 103, in order to anticipate under Section 102 single prior reference must disclose invention in question.

9. Patentability — Aggregation or combination — Of old elements (§51.159)

Patentability — Invention — In general (§51.501)

Fact that component elements are old in art is not alone dispositive of obviousness issue.

10. Patentability — Tests of — Skill of art (§51.707)

Level of ordinary skill in art is another initial determination that must be made under Graham v. John Deere Co., 148 USPQ 459.

11. Patentability — Tests of — Skill of art (§51.707)

Ordinary skill in art relative to transporting haystacks was low.

12. Patentability — Aggregation or combination — Of old elements (§51.159)

Patentability — Anticipation — Combining references (§51.205)

Patentability — Invention — In general (§51.501)

Patentability — Tests of — In general (§51.701)

Patent cannot be held valid for development that would have been obvious to one of ordinary skill in art in light of prior art; prior art may be combined for purposes of demonstrating obviousness; obviousness test is only correct test to be applied in determining whether new combination of known elements amounts to invention.

13. Patentability — Aggregation or combination — Of old elements (§51.159)

Patentability — Anticipation — Combining references (§51.705)

Patentability — Invention — In general (§51.501)

Court must avoid slipping into use of hindsight when determining obviousness; fact that all elements of claimed invention may be disclosed in prior art does not, of itself, negative patentability, as in retrospect many creative developments seem commonplace; critical question under Graham v. John Deere Co., 148 USPQ 459, is whether at time of invention subject would have been obvious to one skilled in art; when prior art references are combined to challenge patentability, test to be applied is, does prior art suggest to one ordinarily skilled in art doing what applicant has done.

14. Presumption from patent grant — Weight of (§55.9)

Patent is presumed valid when issued but presumption is rebuttable, and must be overcome by substantial evidence negating one of three requisites of patentability.

15. Presumption from patent grant — Patent Office consideration of prior art (§55.5)

Presentation to court of prior art not disclosed to Patent Office weakens or destroys presumption of validity; however, mere fact that patent was not cited should not be sufficient to destroy presumption of validity.

16. Presumption from patent grant — Patent Office consideration of prior art (§55.5)

Where Patent Office cites some prior art, but not other equally relevant and similar prior art, presumption of validity is weakened only to extent that teaching of uncited art is not disclosed in cited art.

17. Patentability — Evidence of — In general (§51.451)

Factors such as commercial success of invention, solution to long felt needs, and failure of others to arrive at solution may be considered as evidence of obviousness or unobviousness of invention under Graham v. John Deere Co., 148 USPQ 459.

18. Patentability — Evidence of — Commercial success — Causes (§51.4555)

Factors such as stability of sales of prior art type device may go to minimize argument of commercial success.

19. Patentability — Evidence of — Delay and failure of others to produce invention (§51.459)

Another indicator of nonobviousness of invention was solution of long-felt need for safer and more convenient device; age and volume of prior art cited demonstrates desire to improve art.

20. Patentability — Evidence of — Delay and failure of others to produce invention (§51.459)

Additional indicator of nonobviousness is fact that all elements needed to produce device were readily available; fact that nothing unknown was needed to create invention, and that invention was still not forthcoming, is evidence of fact that invention was nonobvious, and required exercise of inventive act.

21. Patentability — Evidence of — Delay and failure of others to produce invention (§51.459)

Failure of others, attempting to improve upon prior art, to arrive at solution comparable to invention is further evidence of nonobviousness, and may serve to strengthen presumption of patent validity.

22. Patentability — Evidence of — Acquiescence in validity (§51.453)

Fact that others in industry acquiesce in patent validity at expense to themselves may be considered evidence of nonobviousness and patent validity.

23. Patentability — Evidence of — Acquiescence in validity (§51.453)

While fact that accused infringer chose to admit validity of patent and proceed only on infringement issue may not be strong evidence of patent validity, court must consider it of at least some weight in support of validity.

24. Defense — Fraud (§30.05)

Failure to use full candor with Patent Office in prosecution of patent application may be raised as defense to enforceability of patent.

25. Defenses — Fraud (§30.05)

Failure of applicant who did not draw examiners' attention away from prior art patent and who mentioned prior art devices, to disclose to Patent Office prior art patent that was within classes examiners searched, and machine that was thought to have no bearing on his patent and that was abandoned experiment not part of prior art and was similar to devices with which examiners were familiar, does not give rise to unenforceability defense.

Particular patents — Haystack Transporting

3,298,550, Schiltz, Haystack Transporting Device, claims 10 and 11 infringed.

Actions by Farmhand, Inc., against Lahman Manufacturing Company, Inc., and Robert Anderson, doing business as Platte Implement, for patent infringement, in which defendants counterclaim for declaratory judgment of patent invalidity and for violations of antitrust laws, and by Lahman Manufacturing Company, Inc., and against Boyd D. Schiltz (third-party defendant) for violation of antitrust laws.

Judgment for Farmhand, Inc.

Deming Smith, and Davenport, Evans, Hurwitz & Smith, both of Sioux Falls, South Dakota, John D. Gould, and Merchant & Gould, both of Minneapolis, Minn., for Farmhand, Inc. and Boyd D. Schiltz.

Joe L. Maynes, and Maynes, Tonner & Maynes, both of Aberdeen, South Dakota, and Kenneth D. Siegfried, and Schroeder, Siegfried, Ryan & Vidas, both of Minneapolis, Minn., for Lahman Manufacturing Company, Inc., and Robert Anderson.

Nichol, Chief Judge.

This is an action for infringement of claims 10 and 11 of United States Patent No. 3,298,550. This patent issued on January 17, 1967, to Boyd D. Schiltz (Schiltz) for a "Haystack Transporting Device." Plaintiff, Farmhand, Inc. (Farmhand), is the owner of the patent by assignment from Schiltz. Jurisdiction in this court is based upon 28 USC sections 1338 (a) and 1400(b). Venue is proper in this division under 28 USC section 1393(b).

Farmhand is a Delaware corporation having its principal place of business at 1011 South First Street, Hopkins, Minnesota. Defendant Lahman Manufacturing Company, Inc. (Lahman), is a South Dakota corporation, having its principal place of business at Hecla, South Dakota. Lahman manufactures and sells the alleged infringing haystack movers. Defendant Robert Anderson is an individual doing business as Platte Implement in Platte, South Dakota. It is admitted that Anderson has sold the alleged infringing haystack movers, which he purchased from Lahman.

Plaintiff has sued for an injunction restraining further infringement by Defendants, and for damages. Defendants have counterclaimed for a declaratory judgment that United States Patent No. 3,298,550 is invalid. Defendants further counterclaimed for violations of the antitrust laws, 15 USC sections 1-15. Defendants have also filed a third party complaint against Boyd D. Schiltz, patentee of the patent in suit, under the antitrust laws, 15 USC sections 1-15. Upon Defendants' motion, Defendants' counterclaim for antitrust violations, and the third party complaint against Boyd D. Schiltz were severed. The remaining issues were further bifurcated, with the resolution of the issue of damages to await the outcome of the issues of validity and infringement.

The Patent in Suit

The subject of this lawsuit is a "Haystack Transporting Device" for which a patent was obtained by Schiltz. The device described by the patent is commonly referred to as a chain-type haystack mover. The specifications of the patent disclose a device consisting of a mobile frame and tiltable bed for the loading, transporting, and unloading of large haystacks. The claims in issue teach:

> 10. A mobile machine for transporting haystacks and comprising:
>
> (a) an elongated frame,
>
> (b) drive means for imparting generally longitudinally directed movement to said machine relative to the ground,
>
> (c) an elongated bed assembly extending longitudinally of said frame,
>
> (d) means mounting said bed assembly on said frame for tilting movements between an inclined position wherein the bed assembly is adapted for movement with said machine and under a haystack for loading and unloading of a

haystack onto said bed assembly, and a horizontal load transporting position,

(e) said bed assembly including a plurality of laterally spaced longitudinally extending support members,

(f) a plurality of laterally spaced endless conveyor elements one each mounted on a different one of at least some of said support members, and each having upper and lower flights, the upper flights overlying their respective support members and being adapted to carry hay onto and off of said bed assembly as it is moved under a stack,

(g) a plurality of longitudinally spaced hay-engaging teeth on each of said conveyor elements,

(h) and second drive means operative to impart concerted movement to the inclined upper flights of said conveyor elements in a direction opposite to the direction imparted to said machine by said first-mentioned drive means and at a rate on the incline such that said flights have a horizontal component of movement generally equal to the rate of machine movement.

11. The mobile machine defined in claim 10 in which said bed assembly includes a bed frame, said support members having upper surfaces disposed in a plane in overlying spaced relation to said bed frame, said upper flights of the conveyor elements being supported by said top surfaces of the support members.

The operation of the device can be explained by reference to the descriptions contained in the specifications and drawings of the patent. The Schiltz invention provides for chains 27 having upper and lower flights 28 and 29 respectively. Each chain 27 is mounted upon a different one of the longitudinally extending beams 19. The chains 27 provide the primary supporting surface for the haystack during the loading and unloading operations. By driving the chains 27 forwardly at a rate generally equal to the rate the mover is going rearwardly, the upper flights of the chains remain relatively fixed with respect to the haystack. The chains 27 function to lift the haystack from the ground, providing a path for the support beams 19 to move under the haystack between the chains 27 and the ground; and the support beams 19 function to guide and support the chains as they are laid out underneath the haystack. The result is that the chains, beams, and speed relationship of the forward motion of the chains and the rearward motion of the machine, combine to lift the haystack vertically onto the mover bed without appreciable horizontal movement and without disarrangement of the haystack.

The Development of the Chain-Type Haystack Mover

Prior to the advent of the chain-type haystack mover, the device primarily used for moving haystack was a cable-type mover. Cable-type movers had been known in the art for many years. The structure of the cable-type device consisted of a frame supported by wheels; a tiltable bed on the frame; a winch, cable, and sling to load haystacks onto the bed; and a push-off to remove the stack.

When compared to the chain-type mover, operation of the cable-type mover is relatively difficult. The operator must back up to a haystack, tilt the bed of the mover, and then back up further until the mover is tight against the haystack. The operator must then get off the tractor or other conveyance and take the cable sling to the back of the stack. The winch cables are then pulled back and attached to the sling. The operator then places the winch in gear to wind the cables around the winch drums, which act in concert to pull the mover under the stack and to pull the stack onto the bed. To unload a haystack, the operator must release the winch, disconnect the cables from the sling at the back of the stack and remove the sling, hook the pull cables from the winch into the eye of the push-off cables, put the winch in gear, and start the power shaft. This will tighten the cables and pull the push-off to the rear of the mover to slide the stack off. After a stack is unloaded, the mover is readied for the next loading by cleaning off any residual hay, releasing the pull cables from the push-off, and moving the push-off back to its forward position; by hand in the earlier models, or by hydraulic means in the newer ones.

The evidence presented at trial demonstrated numerous shortcomings in the cable-type movers. Many of the required operations are manual and require the operator to leave his conveyance. This can be especially burdensome in inclement weather. The sling, which must be manually positioned, can weigh anywhere from 40 to 150 pounds. Further, in normal operations, the sling can act to slice off the bottom portion of a haystack, leaving part of it in the field. To counter this result, testimony showed that the operator must sometimes stand on the sling to keep it in a lower position. This gives rise to definite safety hazards. Another drawback of this type of mover are the cables themselves. The cables can sliver, and have been known to snap under tension. This also presents a definite safety hazard.

The chain-type mover, it is conceded, has numerous advantages over the cable-type. In operating a chain-type mover the operator need not leave the cab of his truck or tractor during loading or unloading. The chain-type mover eliminates the necessity of manual operations. To load a haystack with the device, the mover is backed up to a haystack, the bed is tilted, and the mover is started back under the stack. At this point the rearward motion of the truck or tractor and the forward motion of the chains on the bed act in concert to lift the stack onto the bed as the bed simultaneously moves further under the stack. Unloading the mover requires a mere reversal of this process. The operation of the chain-type mover is much quicker than that of the cable-type, and enables an operator to load and unload more stacks in a given period of time.

Validity

Defendants allege in their counterclaim for declaratory judgment that the Schiltz patent is invalid. They base their attack on (1) lack of novelty, (2) obviousness of the invention in light of the prior art, and (3) misconduct by Schiltz and his attorneys in the prosecution of the application before the Patent Office.

[1] The requirements for patentability of an invention are set out in 35 USC sections 101-103. To be patentable, the invention must be useful, novel, and nonobvious with respect to the prior art. All three of these requirements must be met by a valid patent. United States v. Adams, 383 U.S. 39, 148 USPQ 479 (1966); American Infra-Red Radiant Co. v. Lambert Industries, Inc., 360 F.2d 977, 149 USPQ 722 (8th Cir. 1966); L & A Products, Inc. v. Britt Tech Corp., 365 F.2d 83, 150 USPQ 770 (8th Cir. 1966).

[2] All patents carry a rebuttable presumption of validity when issued, and the burden of establishing invalidity rests on the party asserting it. 35 USC section 282. Invalidity of a patent must be shown by substantial evidence, not merely a preponderance. L & A Products, Inc. v. Britt Tech Corp., 365 F.2d 83 (8th Cir. 1966); Woodstream Corp. v. Herter's Inc., 446 F.2d 1143, 170 USPQ 380 (8th Cir. 1971). The party asserting the invalidity of a patent must not only overcome the statutory presumption of validity, but must also rebut whatever proof the patentee offers in defense of the validity of his claim. Woodstream Corp. v. Herter's Inc., 446 F.2d 1143, 170 USPQ 380 (8th Cir. 1971).

The utility of the Schiltz invention is undisputed. Serious questions are raised, however, as to its novelty and nonobviousness. Both of the statutory requirements necessitate an examination of the prior art with respect to haystack moving.

A. Prior Art

A substantial amount of evidence was introduced at trial to establish the state of the prior art related to the Schiltz invention. In addition to the five prior art patents cited by the Patent Office examiners,[1] Defendants introduced nine additional patents as pertinent, unconsidered prior art.[2] Of these latter nine, Defendants placed primary reliance upon five: Rogers, No. 2,418,726; Wangsness, No. 1,106,171; Bruce, No. 1,628,871; Lahman, No. 2,761,577; and Holcer, No. 3,120,887. Defendants also maintain that there were four prior inventors of the subject matter in suit,[3] and have concentrated on the machines allegedly built and used by Robert S. Rogers, Jr., and James Sutton. There is no serious dispute over the patents as evidence of prior art for the subject matter of the Schiltz invention. Plaintiff, however, seeks to reject the Sutton and Rogers machines from consideration as elements or evidence of the prior art. This court agrees that the Rogers and Sutton machines cannot be considered prior art in this case.

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[1] The patents cited by the Patent Office examiners, appearing in the file wrapper of the Schiltz patent are: Suverkrup, No. 2,156,438; Lisota, No. 2,408,862; McElhinney et al., No. 2,526,960; Hibbard, No. 2,951,578; Quint, No. 3,025,982. The Bruce Schiltz patent, No. 3,209,932, was removed as part of the prior art by a Rule 131 affidavit.

[2] The nine additional prior art patents cited by Defendants are: Rogers, No. 2,418,726; Lisota, No. 2,466,452; Wangsness, No. 1,106,161; Bruce, No. 1,628,871; Martin, No. 1,258,351; Lahman, No. 2,761,577; Bruce Schiltz, No. 3,209,932; Holcer, No. 3,120,887; French Patent No. 644,220. In addition, at trial Defendants sought to introduce additional prior art patents. Ruling was reserved as to their admissibility. This court has examined these patents also.

[3] The alleged prior inventors are James Sutton, Ivyl Kopecky, Levi Holcer, and Robert S. Rogers, Jr. In addition, Richard Rogers, Mrs. Glen Stokes, and George Engleman were alleged to have had prior knowledge of the invention.

1. *Rogers Machine*

Defendants placed great emphasis at trial and in their briefs on the Rogers machine. This device, a modification of the structure shown in Rogers patent, No. 2,418,726, was allegedly built and used by Mr. Rogers in the early 1940's in connection with his cotton gin operation. The alleged device, as built, differed substantially from the structure disclosed in the patent. Defendants assert that the machine, as allegedly constructed, was substantially the same as the device disclosed by the Schiltz patent, both in structure and in operation.

To prove the existence of the machine, Defendants rely primarily on the oral testimony of Mr. Rogers. The alleged machine was never disclosed in a patent application, nor in any publication. Rogers was the only person who could testify as to use of the machine. There were no photographs or sketches of the device which portray it in its completed form. Defendants did introduce numerous photographs of certain elements of the machine as they now exist. These photographs, however, show nothing more than the basic frame of the device, a length of chain, and the remains of certain components. The missing elements, and the parts of the structure alleged to be most comparable to the Schiltz invention, were filled in by the oral testimony of Mr. Rogers and through illustrative sketches drawn by Mr. Rogers for the purposes of this trial.

Unsupported oral testimony has long been considered suspect in patent cases. The Supreme Court addressed this problem in 1892.

> We now have to deal with certain unpatented devices, claimed to be complete anticipations of this patent, the existence and use of which are proven only by oral testimony. In view of the unsatisfactory character of such testimony, arising from the forgetfulness of witnesses, their liability to mistakes, their proneness to recollect things as the party calling them would have them recollect them, aside from the temptation to actual perjury, courts have not only imposed upon defendants the burden of proving such devices, but have required that the proof shall be clear, satisfactory and beyond a reasonable doubt. Witnesses whose memories are prodded by the eagerness of interested parties to elicit testimony favorable to themselves are not usually to be depended upon for accurate information. The very fact * * * that almost every important patent, from the cotton gin of Whitney to the one under consideration, has been attacked by the testimony of witnesses who imagined they had made similar discoveries long before the patentee had claimed to have invented his device, has tended to throw a certain amount of discredit upon all that class of evidence, and to demand that it be subjected to the closest scrutiny.

The Barbed Wire Patent, 143 U.S. 275, 284-85 (1892); see also Inglett & Co. v. Everglades Fertilizer Co., 255 F.2d 342, 117 USPQ 236 (5th Cir. 1958); United Parts Mfg. Co. v. Lee Motor Products, Inc., 266 F.2d 20, 121 USPQ 206 (6th Cir. 1959); 1 Deller's Walker on Patents section 63 (2d ed. 1964).

Plaintiff has challenged both the memory and veracity of Mr. Rogers. An examination of the testimony of Mr. Rogers leads this court to the conclusion that his oral testimony, and the sketches based upon his recollection, can be afforded little weight. This court finds that Defendants have failed to meet their burden of proof of the existence and use of the Rogers machine. It is therefore concluded that the Rogers machine cannot be considered as prior art under 35 USC sections 102 and 103.

2. *Sutton Machine*

The Sutton machine was built by Glen Stokes and James Sutton in 1957 for the purpose of providing a more efficient means for moving haystacks on Sutton's ranch. It is undisputed that the machine, as originally built, never loaded a haystack. There is some evidence that Sutton sought to get the machine repaired after it broke down when he tried to load a haystack with it, but the machine was never in fact repaired. After the initial unsuccessful attempt to get the machine to load a haystack, it was placed in various yards on the Sutton ranch, where it reposed until it was resurrected for this trial.

There was no patent application filed for the Sutton machine. The machine was never disclosed in a publicly disseminated document. Defendants contend, however, that despite the fact that the Sutton machine did not load any haystacks as originally constructed, it is still prior art under 35 USC section 102.

[3] Defendants, although never expressly stating which subsections of section 102 they are relying upon, apparently base this assertion on either section 102(a) or section 102(g). Initially, the criteria of section 102(a) must be distinguished from those of section 102(g). As the Court of Claims has noted:

> The distinction is important since, unlike a defense under section 102(a) where prior knowledge and use must be "public" at the time the patented invention is made, prior invention under section 102(g) requires only that the invention be complete, i.e., conceived and reduced to practice, and not abandoned, suppressed or concealed.

International Glass Co. v. United States, 408 F.2d 395, 402, 159 USPQ 434, 440 (Ct. Cl. 1969)(Citations omitted). Bearing this distinction in mind, the issues concerning the Sutton machine become: (1) was the machine "reduced to practice", (2) whether the device was abandoned within the meaning of section 102(g), and (3) whether the machine was in prior public use within the requirements of section 102(a).

[4] The initial concern is whether the Sutton machine was ever reduced to practice. It has long been held that a device not reduced to practice cannot be considered as part of the prior art. As the Supreme Court observed in Coffin v. Ogden:

> The invention or discovery relied upon as a defense, must have been complete, and capable of producing the result sought to be accomplished * * *. If the thing were embryonic or inchoate; if it rested in speculation or experiment; if the process pursued for its development had failed to reach the point of consummation, it cannot avail to defeat a patent * * *. Until his work *is done*, the inventor has given nothing to the public.

Coffin v. Ogden, 85 U.S. (18 Wall.) 120, 124-25 (1873) (emphasis in original). Judge Learned Hand has stated the rule concisely:

> * * * another's experiment, imperfect and never perfected, will not serve either as an anticipation or as part of the prior art, for it has not served to enrich it. The patented invention does not become "known" by such use or sale, or by anything of which the art cannot take hold and make use as it stands.

Picard v. United Aircraft Corp., 128 F.2d 632, 635, 53 USPQ 563, 565-566 (2d Cir. 1942). Reduction to practice contemplates an actual and complete use of the particular invention for its intended purpose. Corona Cord Tire Co. v. Dovan Chemical Corp., 276 U.S. 358 (1928); see also Illinois Tool Works, Inc. v. Continental Can Co., 273 F.Supp. 94, 154 USPQ 401 (N.D. Ill. 1967).

Defendants do not contend that the Sutton machine ever loaded a haystack as the machine was originally built. They argue strenuously, however, that the proper test to be applied for reduction to practice is that the machine was so far developed that it could be made operable by the application of ordinary mechanical skill by one skilled in the art. An examination of the evidence in this case shows, however, that this court need not reach the question of whether this is the proper test to apply. Defendants have failed to demonstrate that any modifications to the Sutton machine were the result of the application of ordinary mechanical skill.

The Sutton machine taught the use of powered and nonpowered rollers as the means of conveyance for a haystack during the loading and unloading operations. As so constructed, the machine would not operate to load a haystack. The machine was made operable only after numerous conveying chains were placed on top of the rollers. These chains replaced the rollers both as the means of conveyance and as the primary supporting surface for the haystack during loading and unloading. Although there was conflicting evidence on this point, this court finds that Plaintiff's expert was more convincing. The modifications to the Sutton machine were performed only after the Schiltz patent was well known to those engaged in the art. This court is convinced after an examination of the evidence concerning the Sutton machine that the addition of the chains to the rollers was contrary to the teachings of the Sutton machine, and represented a hindsight application of the teachings of Schiltz, obvious only after the fact with relation to Sutton's machine. It therefore must be concluded that under either test the Sutton machine was not reduced to practice as originally built. Even if this court were to find a reduction to practice, however, the Sutton machine would still fail to satisfy the criteria of sections 102(a) and 102(g) of Title 35.

[5] Section 102(g) requires that an invention not be "abandoned, suppressed, or concealed." The general rule under this section was well stated in International Glass Co., Inc. v. United States, 159 USPQ 434 (Ct. Cl. 1968).

> The courts have consistently held that an invention, though completed, is deemed abandoned, suppressed, or concealed if, within a reasonable time after completion, no steps are taken to make the invention publicly known. Thus, failure to file a patent application; to describe the invention in a publicly disseminated document;

> or to use the invention publicly, have been held to constitute abandonment, suppression, or concealment.

159 USPQ, at 441 (Citations omitted). The Sutton machine was built in 1957. Since that time the machine has never been patented, nor has an application for patent been filed therefor. The machine was never described in a public document or publication. Although there is disagreement as to public use of the machine, this question is more properly considered with relation to section 102(a), which will be discussed, infra. On the basis of these facts, however, this court finds that even if the Sutton machine was reduced to practice, it was abandoned within the meaning of section 102(g).

[6] The Sutton machine also fails to satisfy the criteria of section 102(a) for consideration as prior art. As interpreted by the courts, this section requires that any prior use must have been "public". Simmons v. Hansen, 117 F.2d 49, 48 USPQ 345 (8th Cir. 1941). An experimental use is not a public use within the meaning of this section. See generally 1 Deller's Walker on Patents section 59, at 259 n. 12.

[7] The evidence in this case clearly shows that the use of the Sutton machine as originally built was merely an abortive, experimental use. The mere fact that the attempt to get the device to work was not concealed does not make the use public within the meaning of section 102(a). To reiterate the conclusions of Judge Hand, such use "will not serve either as an anticipation or as part of the prior art, for it has not served to enrich it." Picard v. United Aircraft Corp., 128 F.2d 632, 635, 53 USPQ 563, 565-566 (2d Cir. 1942). The Sutton machine does not satisfy the criteria of section 102(a) for consideration as prior art.

Novelty

As previously noted, it is uncontroverted that the Schiltz invention has utility within the meaning of 35 USC section 101. In order for the invention to be patentable, however, it must also possess novelty. 35 USC section 102.

[8] The general rule under this section is stated in Deller's Walker on Patents:

> In order to negative novelty, or to anticipate an invention, it is necessary that all the elements of the invention or their equivalents be found in one single description or structure where they do substantially the same work in substantially the same way.

1 Deller's Walker on Patents section 57, at 242 (2d ed. 1964). Defendants have experienced some difficulty with the distinction between the proof required by section 102, and that required by section 103. The correct rule is that, while prior art can be combined to demonstrate obviousness under section 103, in order to anticipate under section 102 a single prior reference must disclose the invention in question. See Woodstream Corp. v. Herter's Inc., 446 F.2d 1143, 1151, 170 USPQ 380, 385-386 (8th Cir. 1971).

Defendants asserted three prior anticipations of the Schiltz invention: The Bruce patent, and the Sutton and Rogers machines. As previously discussed, the Sutton and Rogers machines cannot be considered prior art in this suit. Furthermore, although Defendants argue in their brief that the Bruce patent is a complete anticipation of the invention in suit, in the same brief they concede that Bruce lacks element (d) of claim 10 of the patent in suit. This alone is sufficient to negative anticipation. Defendants also failed to introduce evidence to show that the Bruce patent could be made to perform substantially the same functions as the Schiltz invention in substantially the same way, either as the patent reads or with the addition of changes requiring only ordinary mechanical skill.

This court has examined all of the prior art patents in evidence in this case. Based upon this examination, this court finds that none of the patents is an anticipation of the invention in suit. The Schiltz invention is novel under 35 USC section 102.

Nonobviousness

This court, having determined that the Schiltz invention is both useful and novel, must now determine whether the development would have been obvious to one of ordinary skill in the art, in light of the prior art. 35 USC section 103.

> Under (section) 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.

Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 466-467 (1966).

A. Scope and Content of Prior Art

[9] It is conceded that the various mechanical components that make up the Schiltz invention are present in the prior art.

> Courts should scrutinize combination patent claims with a care proportioned to the difficulty and improbability of finding invention in an assembly of old elements.

A&P Tea Co. v. Supermarket Corp., 340 U.S. 147, 152, 87 USPQ 303, 305-306 (1950); see also Anderson's-Black Rock v. Pavement Co., 396 U.S. 57 (1960); Sakraida v. Ag Pro, Inc., U.S. , 189 USPQ 449 (Apr. 20, 1976). The fact that the component elements are old in the art, however, is not alone dispositive of the issue. As Judge Learned Hand observed:

> All machines are made up of the same elements; rods, pawls, pitmans, journals, toggles, gears, cams, and the like, all acting their parts as they always do and always must * * *. But the elements are capable of an infinity of permutations, and the selection of that group which proves serviceable to a given need may require a high degree of originality. It is that act of selection which is the invention; and it must be beyond the capacity of common-place imagination.

Woodstream Corp. v. Herter's Inc., 446 F.2d 1143, 1156-57, 170 USPQ 380, 389-391 (8th Cir. 1971), *quoting* B.G. Corp. v. Walter Kidde & Co., 79 F.2d 20, 22, 26 USPQ 288, 289-290 (2d Cir. 1935). The issue to be determined, therefore, is whether the development of the Schiltz invention was obvious; not whether the various elements which make up the device can be found in isolation in the prior art.

The evidence in this case discloses that, prior to the Schiltz invention, the device used for moving haystacks was the cable-type mover. It is not seriously disputed that the prior art disclosed no chain-type device for moving haystacks. Defendants contend, however, that by combining prior art references the Schiltz device can be created.

The prior art relied upon by Defendants for this purpose consists primarily of the Lahman, Rogers, Wangsness, Holcer, and Bruce patents. It is clear that no one of these patents alone teaches the Schiltz invention.

The Lahman patent discloses the conventional cable-type haystack mover. The primary use of this patent by Defendants is to show the use of a long, wide, tiltable bed upon which a haystack may be loaded. It is undisputed that the device as claimed lacks elements (f), (g), and (h) of claim 10 of the Schiltz patent.

The Rogers patent teaches a device adapted for the loading and unloading of logs. A reading of the patent teaches the use of "fingers" to place logs on the conveyor chains on a tilted ramp leading to the bed assembly. The ramp was not designed for supporting objects during transport.

The Wangsness patent shows a conveying loader to be used in connection with wagons, carts, or other vehicles. The specifications of the patent disclose the purpose of the invention as "relating to loaders and more particularly to devices including means for gathering and conveying hay and grain in the field * * *." Defendants admit that elements (d) and (h) of claim 10 of the Schiltz patent are not disclosed by Wangsness.

The Holcer patent is relied upon as teaching the speed relationship disclosed by claim 10(h) of the Schiltz patent. Claim 1 of Holcer claims "means drivingly connecting said drive means to said conveyor assemblies for driving said flexible members at a speed approximately equal to the ground speed of said frame." It is undisputed that the structure of the Holcer invention does not disclose the Schiltz device.

The Bruce patent addresses a fertilizer or straw spreader which may be pushed into a pile of this material to withdraw a certain amount for spreading. Bruce lacks elements (d) and (h) of claim 10 of the Schiltz invention.

An examination of the patents primarily relied upon by Defendants shows that none of the inventions disclosed by the patents, with the exception of the Lahman patent, relates to the moving of haystacks. While some of the patents refer to the moving of hay, this hay consists either of loose hay in the field, or of bales of hay. The Defendants contend, however, that minor modifications of the prior art would have produced the Schiltz invention. At this point, this court merely finds that the prior art patents introduced in evidence in this case show the scope and content of the prior art related to the Schiltz invention.

B. Level of Ordinary Skill in the Art

[10] Another initial determination which must be made under the holding in Graham is the level of ordinary skill in the art.

> A finite quantitative definition of this ordinarily skilled person is difficult at best * * *. Rather the various prior art approaches employed, the types of problems

encountered in the art, the rapidity with which innovations are made, the sophistication of the technology involved, and the educational background of those actively working in the field are among the factors which will ofttimes aid in developing a picture of what is the level of skill of the ordinary person in the art.

Jacobson Brothers, Inc. v. United States, 512 F.2d 1065, 1070-71, 184 USPQ 181, 184-186 (Ct. Cl. 1975). The Jacobson court went on to note that commercial success and failure of others may be useful as real-life indicia of the level of ordinary skill in the art, as well as being secondary proof of the validity of a patent. 512 F.2d, at 1071, 184 USPQ 185-186.

Defendants introduced little evidence specifically directed to the issue of the level of ordinary skill in the art. Nonetheless, an examination of the evidence in toto discloses to this court sufficient bases from which to make the required finding.

[11] The evidence shows that the prior art approach to haystack moving relied exclusively on the cable-type mover, in one form or another, since 1897. While numerous advances had been made in the cable-type mover over the years, Defendants could point to no successful variation on that theme prior to the Schiltz invention. The prior attempts of Sutton and Kopecky to automate haystack moving had met with failure. The majority of people working in this area were not technicians and engineers; rather, they were farmers, ranchers, blacksmiths, and custom haystack movers. The formal educational level of these persons was generally low. An examination of all of the evidence in this case convinces this court that the level of ordinary skill in the art was relatively low.

C. Differences Between the Schiltz Invention and the Prior Art

As previously discussed, there are easily apparent differences between the Schiltz invention and each of the individual prior art patents in evidence in this case. The only patent directed to the problem of moving haystacks is the Lahman patent. The differences between this device and the Schiltz invention are clear, and have been thoroughly examined in this opinion. The remainder of the inventions disclosed by the patents relate to various types of conveyor systems for use in loading and conveying things other than haystacks. While there is conflicting expert testimony on the point, this court finds Plaintiff's experts more convincing after independently examining the prior art. This court finds that, with the exception of Lahman, none of the patents in evidence discloses a device capable of automatically loading a haystack without substantial modification.

Another difference between the Schiltz invention and the prior art, upon which Plaintiff places great emphasis, is the difference in frictional characteristics between the Schiltz invention and the prior art cable-type movers. This difference comes about because of the concerted action of the support beams, conveying chains, and speed relationship disclosed by the Schiltz patent. In simplified terms, the result of this concerted action is that the primary support chains remain relatively fixed with respect to the bottom of the haystack. The result of this is that more of the haystack can be removed from the field, and that the haystack will be disarranged insubstantially during the loading and unloading operation. This operation is in contrast to that of the cable-type mover, where the haystack is pulled onto the bed of the mover during loading and pushed off during unloading. This action creates a sliding friction which tends to more seriously disarrange the haystack. Plaintiff posits that this is a significant advantage over the prior art movers, and was not shown by any of the prior art patents.

D. Conclusions on Obviousness

[12] It is well settled that a patent cannot be held valid for a development which would have been obvious to one of ordinary skill in the art in light of the prior art. Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966); American Infra-Red Radiant Co. v. Lambert Industries, Inc., 360 F.2d 977, 149 USPQ 722 (8th Cir. 1966). Prior art may be combined for purposes of demonstrating obviousness. As noted by the Eighth Circuit Court of Appeals, the test of obviousness is the *only* correct test to be applied in determining whether a new combination of known elements amounts to invention. American Infra-Red Radiant Co. v. Lambert Industries, Inc., 360 F.2d 977, 149 USPQ 722 (8th Cir. 1966).

[13] It is incumbent upon this court, however, when determining the issue of obviousness, to avoid slipping into the use of hindsight. Graham v. John Deere Co., 383 U.S. 1 (1966), 148 USPQ 459. The fact that all the elements of the claimed invention may be disclosed in the prior art does not, of itself, negative patentability. Dann v. Johnston, U.S. , 189 USPQ 257 (Mar. 31, 1976); Deepsouth Packing Co., Inc. v. Laitram Corp., 406 U.S. 518, 173 USPQ 769 (1972). As the court observed in Woodstream:

> In retrospect, many creative developments seem commonplace. The critical question under *Graham* is whether *at the time of the invention* the subject would have been obvious to one skilled in the art.

Woodstream Corp. v. Herter's Inc., 446 F.2d 1143, 1156, 170 USPQ 380, 389-390 (8th Cir. 1971)(emphasis added). When prior art references are combined to challenge the patentability of an invention the test to be applied is: Does the prior art suggest to one ordinarily skilled in the art doing what the applicant has done? 2 Deller's Walker on Patents section 110, at 220 (2d ed. 1964); see also United States v. Adams, 383 U.S. 39, 50, 148 USPQ 479, 483 (1966); Dann v. Johnston, U.S. , 189 USPQ 257 (Mar. 31, 1976).

Viewing the prior art as a whole, it cannot be said that the prior art would have suggested to the ordinary man skilled in the art the developments achieved by Schiltz. Although there is conflict in the expert testimony on this point, this court finds the testimony of Plaintiff's experts more convincing. Indeed, two of Defendants' experts gave testimony which supports the finding of nonobviousness. Mr. Wolfe and Mr. Lahman were actively engaged in research and development in the haystack moving industry. At the time they were working, all of the additional prior art patents cited by Defendants were available. Nevertheless, neither of these men developed a concept similar to that of Schiltz. Wolfe's last patent application, filed while he was working on haystack mover development for Farmhand in 1957, was for a cable-type mover. Lahman, even after seeing an operating mover based on the Schiltz disclosures, misunderstood the function of the chains on the device, and was unsuccessful in his early attempts to develop a chain-type mover. Both of these men were possessed of more than ordinary skill in the art; yet the subject matter of the Schiltz invention was not obvious to them.

Perhaps better evidence of the nonobviousness of the subject matter of the Schiltz invention to those of ordinary skill in the art can be derived from the Sutton-Stokes attempt. The Sutton machine was clearly an attempt to improve upon cable-type movers. It was equally clearly a failure. Sutton and Stokes failed to recognize the advantages of keeping the surface of the conveying elements relatively fixed with respect to the bottom of the haystack during a loading operation. As a result, the Sutton machine never loaded a haystack, and the attempt was abandoned. It was only after the teachings of Schiltz became well known that the Sutton machine was made to function; and the modifications to this machine to achieve success were obvious only after Schiltz.

Defendants have not demonstrated to this court that the achievements of Schiltz were obvious in light of the prior art patents in evidence in this case. Defendants introduced many graphic illustrations to demonstrate how the prior art could be combined to create the invention in suit. At no point, however, did Defendants show that these combinations would have been obvious. As noted above, the proper test to be applied in a suit involving a combination of elements known in the art is whether the prior art as a whole would suggest doing what an applicant has done. Defendants have offered no evidence to show how, short of the exercise of an inventive faculty or of hindsight, one would determine which of the various elements to combine to create a device for the purpose addressed by the Schiltz patent.

[14] Even assuming the Defendants have introduced credible evidence of obviousness, this court finds that they have failed to introduce sufficient evidence to carry their burden of proof. A patent is presumed valid when issued. 35 USC section 282. This presumption is rebuttable, but must be overcome by substantial evidence negating one of the three requisites of patentability. L&A Products v. Britt Tech Corp., 365 F.2d 83, 150 USPQ 770 (8th Cir. 1966); Woodstream Corp. v. Herter's Inc., 446 F.2d 1143, 170 USPQ 380 (8th Cir. 1971).

[15] Defendants rely on the rule that the presentation to the court of prior art not disclosed to the Patent Office weakens or destroys the presumption of validity. American Infra-Red Radiant Co. v. Lambert Industries, Inc., 360 F.2d 977, 149 USPQ 722 (8th Cir. 1966). The cases relying on this reasoning, however, require that the uncited prior art must be pertinent to the subject matter in issue. Ralston Purina Co. v. General Foods Corp., 442 F.2d 389, 170 USPQ 202 (8th Cir. 1971). Furthermore, the mere fact that a patent was not cited should not be sufficient to destroy the presumption of validity. It has been held that a search record is prima facie evidence that all patents contained in the classes and subclasses searched were examined. Deering Milliken Research Corp. v. Beaunit

Corp., 382 F.Supp. 403, 182 USPQ 421 (W.D.N.C. 1974). The evidence in this case shows that all the patents introduced by Defendants as pertinent, unconsidered prior art were contained in the classes searched by the Patent Office examiners. Defendants assert that these patents were overlooked by the examiners. This court, considering the evidence of the experience of the examiners involved, finds that it is more likely that the examiners chose not to cite the patents, finding them no more illuminating than those cited in the file wrapper of the patent in suit.

[16] Even if this court were to conclude that the examiners overlooked these patents, this will not necessarily destroy the presumption of validity. As the court observed in Illinois Tool Works, Inc. v. Continental Can Co.:

> Where the Patent Office cites some prior art, but not other equally relevant and similar prior art, the presumption of validity is weakened only to the extent that the teaching of the uncited art is not disclosed in the cited art.

Illinois Tool Works, Inc. v. Continental Can Co., 273 F.Supp. 94, 111, 154 USPQ 401, 415-416 (N.D. Ill. 1967). The Seventh Circuit has gone even further, holding that the introduction of additional prior art similar to that considered by the Patent Office examiners strengthens the presumption of the validity of the patent. TSC Industries, Inc. v. International Harvester Co., 406 F.2d 53, 160 USPQ 34 (7th Cir. 1968). An examination of the patents cited by Defendants convinces this court that they are no more pertinent to the subject matter of the patent in suit than those cited by the examiners. Defendants have failed to destroy the statutory presumption of the validity of the patent through the introduction of prior unconsidered art.

This court has carefully examined all of the prior art in this case. On the basis of this examination, and considering the testimony of the witnesses at trial, it must be concluded that Defendants have failed to carry their burden of proving the invalidity of the Schiltz patent by substantial evidence. This court concludes that the subject matter of the Schiltz invention was not obvious to one of ordinary skill in the art at the time of invention. None of the cited prior art disclosed devices designed for moving large haystacks, or similar objects, through the use of chain conveyors. Defendants have failed to show by substantial evidence that the prior art disclosures could be combined and modified by one of ordinary skill in the art to achieve the result of the Schiltz patent.

E. Secondary Considerations

[17] The conclusion that the invention of Boyd Schiltz was not obvious is buttressed by numerous secondary considerations. The Court in Graham recognized that factors such as commercial success of the invention, the solution to long-felt needs by the invention, the failure of others to arrive at the solution, among others, may be considered as indicia of obviousness or nonobviousness.

1. *Commercial Success*

[18] Plaintiff has introduced evidence of the commercial success it has enjoyed since it acquired the patent in suit. Within five years of the date of invention, the chain-type haystack mover was taking over the market, despite the fact that it was more expensive than the cable-type mover. Defendants' brief attempts to attribute this success to factors other than the invention in suit. While certain factors such as the stability of Lahman's sales of the cable-type mover may go to minimize the argument of commercial success, most of the arguments advanced against the invention as the cause of the commercial success of Farmhand are unconvincing. This court cannot understand why, even if the economic factors were such that more farmers and ranchers would buy more haystack movers, the purchasers would buy the more expensive chain-type movers unless there was some advantage to this device as compared to the cable-type. This court is convinced that the reason for the commercial success of the Schiltz device was its comparative advantages over the cable-type mover.

2. *Long-Felt Need*

[19] Another indicia of the nonobviousness of the invention was the solution to the long-felt need for a safer and more convenient means for moving haystacks. The evidence shows that Farmhand's employees (including Defendants' expert Mr. Wolfe), and Lahman, among others, had long been attempting to develop improvements in the cable-type haystack mover. The activities of Sutton and Kopecky also bear witness to attempts to improve the art of haystack moving. The age and volume of the prior art cited in this case also demonstrates the desire to improve the art. See Deering Milliken Research Corp. v. Beaunit Corp., 382 F.Supp. 403, 182 USPQ 421 (W.D.N.C. 1974). The advent of the Schiltz invention solved the needs felt by

persons working in this area. As Lahman himself admitted, the Schiltz device provided a safe, quick, and efficient device whereby one person could load and unload haystacks without leaving the seat of his conveyance.

3. *No Unknown or Unavailable Element Required*

[20] An additional indicator of the nonobviousness of the invention in suit is the fact that all of the elements needed to produce the device patented by Schiltz were readily available. This factor has been recognized as bearing on the obviousness of the invention. Lyon v. Bausch & Lomb Optical Co., 224 F.2d 530, 106 USPQ 1 (2d Cir. 1955); B.G. Corp. v. Walter Kidde & Co., 79 F.2d 20, 26 USPQ 288 (2d Cir. 1935). The fact that nothing unknown was needed to create the invention, and that the invention was still not forthcoming, is evidence of the fact that the invention was nonobvious, and required the exercise of an inventive act.

4. *Failure of Others*

[21] Failure of others, attempting to improve upon the prior art, to arrive at a solution comparable to the invention in question is further evidence of the nonobviousness of the invention, and may serve to strengthen the presumption of validity of the patent. Reeves Instrument Corp. v. Beckman Instruments, Inc., 444 F.2d 263, 170 USPQ 74 (9th Cir. 1971). This court has received evidence of two prior failures of persons attempting to improve the art of haystack moving by abandoning the use of cables. Kopecky attempted to build a self-loading haystack mover. The device would not function, and he converted it into a cable-type mover. Sutton's attempt has been previously discussed. This device was also an abandoned failure. Defendants have been unable to show any prior successful attempt to automate the haystack mover.

5. *Acquiescence in Validity by Others*

[22] The fact that others in the industry acquiesce in the validity of the patent at expense to themselves may be considered evidence of the nonobviousness and validity of the patent. Shaw v. E.B. & A.C. Whiting Co., Inc., 417 F.2d 1097, 163 USPQ 580 (2d Cir. 1969). The evidence in this case showed that Plaintiff has received in excess of $200,000 in royalties from its licensing of the patent in suit. Perhaps even more persuasive of the acquiescence in validity by others is the fact that Craven never contested the validity of the patent when sued for infringement. Farmhand, Inc. v. Craven, 455 F.2d 609, 173 USPQ 1 (8th Cir. 1972).

[23] Defendants are correct in pointing out that there may be sound economic reasons for paying royalties and avoiding a costly patent suit, especially when someone else is challenging the patent in the courts. They fail to successfully explain, however, why Craven, when confronted with an infringement action, chose to admit the validity of the patent and proceed only on the issue of infringement. While this may not be strong evidence of the validity of the patent, this court must consider it of at least some weight in support of the validity of the patent.

F. Miscellaneous Defenses

Defendants have also alleged that the Schiltz patent should be found invalid because of Plaintiff's alleged lack of candor with the Patent Office during the prosecution of his application. Specifically, it is alleged that Schiltz and his attorneys failed to disclose the Lahman patent, the Sutton machine, the alleged contributions of Bruce Schiltz and Ivyl Kopecky, and the alleged best mode of the invention.

[24] It is well settled that failure to use full candor with the Patent Office in the prosecution of an application for a patent may be raised as a defense to the enforceability of the patent. Precision Instrument Mfg. v. Automotive Maintenance Machinery Co., 324 U.S. 806, 65 USPQ 133 (1945). As this standard has been recently interpreted by the Eighth Circuit Court of Appeals, however, more than a merely good faith or innocent non-disclosure must be shown; intent to deceive must be proved. Pfizer, Inc. v. International Rectifier Corp., 538 F.2d 180, 190 USPQ 273 (8th Cir. 1976).

[25] This court finds that any nondisclosure of the Lahman patent and the Sutton machine were in good faith, and will not give rise to the defense. The evidence shows that the Lahman patent was within the classes searched by the Patent Office examiners, and that there was no showing of an affirmative attempt to draw the examiners' attention away from the Lahman patent as part of the prior art. In fact, the Schiltz patent application specifically mentions the prior art cable-type movers and discusses their drawbacks. The Sutton machine was not disclosed to the Patent Office because Schiltz did not think the device had any bearing on what he sought to patent. As previously discussed, the Sutton machine was an abandoned experiment

which cannot be considered part of the prior art. The deposition testimony of the examiners discloses their familiarity with devices similar to the Sutton machine. These facts lead this court to the conclusion that failure to disclose the Lahman patent and the Sutton machine will not give rise to the unenforceability defense.

Defendants also urge that Schiltz and his attorneys failed to disclose the contributions of Bruce Schiltz and Ivyl Kopecky. Defendants have alleged that Bruce Schiltz and Ivyl Kopecky are prior inventors of the subject matter of the patent in suit. They also allege that Kopecky is a co-inventor by reason of the "Kopecky Drive" which was added to the Schiltz device prior to the date when the patent was issued. Finally, they contend that by failing to specifically note the "Kopecky Drive" in his application, Schiltz failed to set forth the best mode of operation for his invention.

The evidence presented by Defendants in support of their allegations that Bruce Schiltz and Ivyl Kopecky were prior inventors is unconvincing at best. The main emphasis of Defendants' argument is placed on the alleged prior conception of Bruce Schiltz. The only evidence which was offered to prove the fact of prior conception or invention was the unsupported deposition testimony of Bruce Schiltz. There were no drawings of his alleged conception. There was no evidence presented of any attempt to reduce this conception to practice. This court finds that Defendants have failed to prove that Bruce Schiltz was a prior inventor of the subject matter of the invention in suit, and have failed to prove that he made any contribution to the invention which should have been disclosed to the Patent Office.

Defendants' contentions relating to Ivyl Kopecky concern the development and use of the "Kopecky Drive" on the Schiltz device. From the evidence, this court finds that Kopecky was neither a prior inventor nor a co-inventor of the subject matter of the Schiltz invention. The addition of the "Kopecky Drive" was made only after the Schiltz invention had been conceived and reduced to practice. Nor does this court find any convincing evidence that the "Kopecky Drive" is part of the best mode of operation of the Schiltz invention. 35 USC section 112 requires that:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most clearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.
>
> • • •

The Schiltz patent specifically provides:

> Having noted that means must be provided in accordance with the present invention for moving the conveyor chains in unison on the support members 19, it will be appreciated that *various suitable driving arrangements may be provided to accomplish such movements*. (emphasis added)

There has been no evidence introduced to show that the disclosure of the patent is insufficient to enable one skilled in the art to reduce the invention to practice. Plaintiff's evidence shows that Schiltz had successfully used his machine for loading haystacks prior to the addition of the "Kopecky Drive." There is no evidence that Schiltz attempted to conceal anything, or to deceive the Patent Office or the public by failing to set forth the "Kopecky Drive" as the best mode for his invention. See Flick-Reedy Corp. v. Hydro-Line Mfg. Co., 351 F.2d 546, 550-51, 146 USPQ 694, 696-698 (7th Cir. 1965). There is no convincing evidence to show that the "Kopecky Drive" was in fact the best mode of operation of the Schiltz invention. This court concludes that Defendants' arguments based on the Kopecky contributions must fall as not being sustained by the evidence.

This court concludes that Defendants have failed to make out a defense based on misconduct and lack of candor before the Patent Office. Defendants have failed to carry their burden of proof to show any contribution by Bruce Schiltz or Ivyl Kopecky sufficient to invalidate the patent.

Defendants have also alleged that Boyd Schiltz filed a knowingly inaccurate and incomplete affidavit under Rule 131 in the prosecution of his application before the Patent Office. This defense is apparently based upon the assertion that the Schiltz device had not been successfully reduced to practice by August 12, 1963, as testified to in the affidavit. Defendants have introduced no convincing evidence in support of this allegation. Plaintiff, on the other hand, has introduced the deposition testimony of Ivyl Kopecky, who stated that he witnessed a successful use of the Schiltz device on approximately August 5-8, 1963, on the Bill Rodman farm. After considering the evidence, this court finds that the Schiltz invention was successfully reduced to practice prior to August 12, 1963. It is therefore concluded that Defendants' assertion of bad faith in the Rule 131 affidavit has not been proved.

Finally, Defendants moved for summary judgment immediately prior to trial. This motion was based on Muncie Gear Works, Inc. v. Outboard Marine & Mfg. Co., 315 U.S. 759, 53 USPQ 1 (1942), and 35 USC sections 102(b) and 112. The basis for Defendants' motion was that the claims in issue did not set forth the fact that the conveyor chains on the Schiltz invention might move slower than the rearward speed of the mover; and that the addition of the claims in issue, which are allegedly broader than the original claims, came after the Schiltz device had been in public use for more than one year.

Defendants' contentions are not well founded. After an examination of the file wrapper of the Schiltz patent, this court finds that claims 10 and 11 are supported by the original specification filed with the Patent Office.

Claim 3(g) of the original application recited:

> (g) second drive means connected to said first drive means and operative to impart concerted movement to the upper flights of said conveyor chains in a direction opposite to the direction of the generally longitudinal movement imparted to said machine by said first drive means and also at a rate generally equal to said machine movement.

This court agrees with the analysis applied by the court in Farmhand, Inc. v. Craven, 455 F.2d 609, 173 USPQ 1 (8th Cir. 1972):

> Defendant posits the argument that if the horizontal movement of the chain conveyor is to be generally equal to the backward movement of the truck, then in the inclined loading position the chains must go at a faster rate than the truck. This reads the specification to mean that the roller chains *must* move faster in order to achieve exact mathematical equality between the truck and the chains on the horizontal. The specifications do not require this.

455 F.2d, at 610, 173 USPQ 2 (emphasis in original). As interpreted by the court in Craven, this statement in the original specification supports chain movement slightly greater than or slightly slower than the back up speed of the mover. This court concludes that Defendants' sections 102(b) and 112 and Muncie Gear defenses must fail as unsupported by the evidence.

Infringement

Having found United States Patent No. 3,298,550 valid and enforceable, this court must now determine whether the patent is infringed by the Lahman haystack movers. Defendants admit that the Lahman movers have all the elements of claim 10 of the Schiltz patent, with the exception of element (h). They also admit that infringement under claim 11 will turn on the finding as to claim 10. Defendants contend that the Lahman movers do not infringe the Schiltz patent because they do not have, or need, element (h) of claim 10.

The tests for infringement were set out by the Supreme Court in Graver Tank & Mfg. Co. v. Linde Air Products Co., 339 U.S. 605, 85 USPQ 328 (1950):

> In determining whether an accused device or composition infringed a valid patent, resort must be had in the first instance to the words of the claim. If the accused matter falls clearly within the claim, infringement is made out and that is the end of it.
>
> But courts have also recognized that to permit imitation of a patented invention which does not copy every literal detail would be to convert the protection of the patent grant into a hollow and useless thing. Such a limitation would leave room for — indeed encourage — the unscrupulous copyist to make unimportant and insubstantial changes and substitutions in the patent which, though adding nothing, would be enough to take the copied material outside the claim, and hence outside the reach of law. One who seeks to pirate an invention, like one who seeks to pirate a copyrighted book or play, may be expected to introduce minor variations to conceal and shelter the piracy. Outright and forthright duplication is a dull and very rare type of infringement. To prohibit no other would place the inventor at the mercy of verbalism and would be subordinating substance to form. It would deprive him of the benefit of his invention and would foster concealment rather than disclosure of inventions, which is one of the primary purposes of the patent system.

339 U.S., at 607, 85 USPQ at 330. The test in the Eighth Circuit was expressed in Craven, a case involving the patent which is the subject of the instant action. Applying the equivalency test in this circuit entails

making the determination that, the infringing device must be substantially identical with the one alleged to be infringed in (1) the result attained; (2) the means of attaining that result; and (3) the manner in which its different parts operate and cooperate to produce that result.
455 F.2d, at 611, 173 USPQ at 2-3. (Citations omitted).

Applying these tests to the facts in this case, it is the conclusion of this court that the Lahman haystack movers infringe claims 10 and 11 of United States Patent No. 3,298,550. Defendants' contention that the Lahman mover lacks the first drive means of element (h) of claim 10 cannot be accepted. Defendants' evidence shows that in normal operation of the Lahman mover a tractor or other means of conveyance is essential. This is the essence of the first drive means. To argue that the trailer-type mover does not use a first drive means in the loading operations is to ignore the realities of the situation. The evidence shows that the Lahman mover is sold to be used with a tractor or other conveyance. The operator's manual for the Lahman mover discloses the cooperative arrangement between the first drive means conveyance and the trailer loader during the loading operation. This court finds that the Lahman mover in operation has the first drive means and cooperative speed relationship of element (h) of claim 10 of the Schiltz patent. It is concluded that the Lahman mover literally infringes claims 10 and 11 of the Schiltz patent, No. 3,298,550.

Even if no literal infringement were found, the Lahman mover must still be found to infringe the Schiltz patent under the doctrine of equivalents. Graver Tank & Mfg. Co. v. Linde Air Products Co., 339 U.S. 605, 85 USPQ 328 (1950). Defendants do not argue that the Lahman mover differs from the Schiltz invention in the means used and the results attained. Their argument centers on the way the various parts function to attain the result. This was the same argument advanced in Farmhand, Inc. v. Craven, 455 F.2d 609, 173 USPQ 1 (8th Cir. 1972). This court finds the reasoning of the decision in that case applicable here. Defendants argue that element (h) of claim 10 is unnecessary to the Lahman machine. This court finds that this contention misreads the claims of the patent in suit. The Lahman haystack mover, as actually operated, makes full use of the first drive means and speed relationship disclosed in claim 10(h). Defendants' witness Mr. Eggleston, who owns and operates a Lahman chain-type mover, testified on cross examination that in the loading process the conveyance is driven backward to push the trailer under the haystack, and that the speed relationship between the rearward movement of the conveyance and the forward movement of the conveying chains was approximately equal. This court has also examined films of the operation of these devices, and attended a demonstration of their use. After considering all the evidence, this court finds that the Lahman haystack mover does the same work, in substantially the same way, to achieve the same result, as the Schiltz mover. It must be concluded, therefore, that the Lahman chain-type haystack mover infringes United States Patent No. 3,298,550.

The foregoing memorandum decision constitutes the court's findings of fact and conclusions of law pursuant to Rule 52 of the Rules of Civil Procedure.

United States Court of Appeals

FOR THE EIGHTH CIRCUIT

No. 77-1072

Farmhand, Inc.,	*	
	*	
Appellee,	*	
	*	Appeal from the United
v.	*	States District Court
	*	for the District of
Lahman Manufacturing Company, Inc. and Robert Anderson, d/b/a Platte Implement,	*	South Dakota.
	*	
	*	
	*	
Appellants.	*	

Submitted: October 13, 1977

Filed: January 11, 1978

Before BRIGHT, WEBSTER and HENLEY, Circuit Judges.

HENLEY, Circuit Judge.

This patent infringement suit is before us on appeal from the United States District Court for the District of South Dakota.

Plaintiff, Farmhand, Inc., is a Delaware corporation with its principal place of business in Hopkins, Minnesota. Plaintiff is engaged in the business of manufacturing and selling farm implements and is the owner by assignment of United States Letters Patent No. 3,298,500 issued in 1957 to Boyd D. Schiltz. The patent describes and covers a device whereby large haystacks can be loaded on trailers

or trucks, transported to a desired destination, and then unloaded by the use of a chain type hoisting apparatus.

Defendant, Lahman Manufacturing Company, Inc., is a South Dakota corporation with its principal place of business in Heckla, South Dakota. Like plaintiff, it is engaged also in the manufacture of farm implements, including a stack moving device which plaintiff contends infringes the Schiltz patent.

The other defendant, Robert Anderson, is an individual who does business as Platte Implement in Platte, South Dakota. During the suit period he sold allegedly infringing machines which he had purchased from Lahman.

Claiming that the Lahman machine infringed Claims 10 and 11 of its patent, plaintiff commenced this action against Lahman and Anderson in 1972. The defendants answered and filed counterclaims against plaintiff seeking a declaratory judgment to the effect that the patent in suit is invalid and seeking damages for alleged violations of the federal antitrust laws, 15 U.S.C. §§ 1 - 15. A third party complaint was also filed against the inventor, Schiltz. In due course the antitrust claims of the defendants against plaintiff and Schiltz were severed from the plaintiff's patent infringement claims and were ultimately dismissed summarily. The severed claims are not involved in this appeal.

In its complaint Farmhand sought injunctive relief and treble damages, together with an attorney's fee and costs. It appears that by agreement determination of the amount of damages, if any, sustained by plaintiff was postponed

pending the district court's decision on the underlying issues of patent validity and infringement.

The case was the subject of a bench trial of eighteen days duration which was conducted by Chief District Judge Fred J. Nichol. On September 27, 1976 Judge Nichol filed a memorandum opinion incorporating his findings of fact and conclusions of law. *Farmhand, Inc. v. Lahman Mfg. Co.*, 192 USPQ 749 (1976). The district court found that Claims 10 and 11 of the patent in suit were valid and infringed, and that plaintiff was entitled to injunctive relief and to damages. However, no determination has yet been made as to the amount of damages that plaintiff should recover. The district court found that the case was not an "exceptional" one and denied plaintiff's claim for an attorney's fee. *See* 35 U.S.C. § 285. Plaintiff does not complain of that ruling.

Plaintiff's device was put on the market in 1963. Prior to that time persons who had occasion mechanically to move haystacks from one place to another did so by lashing the stacks to tiltable truck or trailer beds by means of cables and winches. A stack would then be transported to its destination by truck or by tractor and would be unloaded by retilting the bed or trailer and releasing the stack therefrom.[1]

---

[1] *See Farmhand, Inc. v. Craven*, 455 F.2d 609 (8th Cir. 1972). That suit was brought against Russell O. Craven of South Dakota, a leading producer of cable-type movers. Plaintiff claimed that Craven had infringed Claim 10(h) of the Schiltz patent. The defendant conceded the validity of the patent but denied infringement. The defendant prevailed in the district court. *Farmhand, Inc. v. Craven*,

Plaintiff's device also makes use of tiltable beds or trailers which are part of or connected with trucks or trailers. However, plaintiff's device differs substantially from the old cable type movers. In *Farmhand, Inc. v. Craven*. 455 F.2d 609, 609 (8th Cir. 1972), the court described plaintiff's device as follows:

> Plaintiff's device employs six roller chain belts running lengthwise in beams on an elongated truck or trailer bed. As the truck is backed into a haystack the load carrying surface is slightly inclined and the roller chains serve as a conveyor pulling the haystack onto the load surface. . . .

The operation of plaintiff's device was described by Judge Nichol in this case as follows:

> . . .To load a haystack with the device, the mover is backed up to a haystack, the bed is tilted, and the mover is started back under the stack. At this point the rearward motion of the truck or tractor and the forward motion of the chains on the bed act in concert to lift the stack onto the bed as the bed simultaneously moves further under the stack. Unloading the mover requires a mere reversal of this process. . . .

192 USPQ at 754.

One significant feature of plaintiff's mover is that the forward movement of the chain conveyor is at approximately the same speed as that of the backward motion of

---

324 F.Supp. 207 (D. So.Dak. 1971). The judgment of the district court was reversed by this court which was of the view that infringement had been shown.

the bed as it is being pushed under the stack to be moved. *See* discussion in *Farmhand, Inc. v. Craven, supra.*[2]

There is no question that plaintiff's chain-type mover is superior to the old cable-type movers in a number of ways. The cable-type movers were slow and relatively inefficient; some of the necessary operations had to be performed manually and required the operator to dismount from his truck or tractor which could be particularly burdensome in bad weather; and the cable-type movers presented some safety hazards. After pointing out some of the disadvantages of the cable-type mover, the district court went on to say:

> The chain-type mover, it is conceded, has numerous advantages over the cable-type. In operating a chain-type mover the operator need not leave the cab of his truck or tractor during loading or unloading. The chain-type mover eliminates the necessity of manual operations. . .The operation of the chain-type mover is much quicker than that of the cable-type, and enables an operator to load and unload more stacks in a given period of time.

192 USPQ at 754.

While conceding that plaintiff's device is a useful one and is an improvement over the cable-type stack movers that have been described, the defendants contended in the district court and contend here that the patent in suit is invalid or that, if valid, it has not been infringed.

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[2]Claims 10 and 11 of the Schiltz patent are set out in full in the district court's opinion and will not be copied here.

It is not our function to try this case de novo. We are required to accept the factual findings of the district court unless clearly erroneous, Fed. R. Civ. P. 52(a), and if the district court applied correct standards of law to the acceptable facts of the case, its judgment must be affirmed.

From our consideration of the record, we are satisfied that the factual findings of the district court are adequately supported by the evidence, and that the district court did not err in applying the law to the facts. Accordingly, we affirm the district court's judgment and do so principally on the basis of the opinion of Judge Nichol which we consider to be detailed, painstaking and well reasoned.

Looking first at the issue of infringement, plaintiff claimed that the defendants had infringed Claim 10(h) and Claim 11 of the patent, and it seems to have been conceded that if Claim 10(h) had been infringed Claim 11 had also been infringed.

Citing the tests of infringement laid down in *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 607 (1950), and in *Farmhand, Inc. v. Craven, supra*, 445 F.2d at 611, the district court found that the claims in question had been infringed by equivalent if not literally. In *Farmhand, supra*, 445 F.2d at 611, we said:

> . . .Applying the equivalency test in this circuit entails making the determination that, "'the infringing device must be substantially identical with the one alleged to be infringed in (1) the result attained; (2) the means of

> attaining that result; and (3) the manner in which its different parts operate and co-operate to produce that result.'" Montgomery Ward & Co. v. Clair, 123 F.2d 878, 881 (8 Cir. 1941). See Ralston Purina Co. v. General Foods Corp., 442 F.2d 389, 393 (8 Cir. 1971); General Bronze Corp. v. Cupples Products Corp., 189 F.2d 154, 159 (8 Cir. 1951).

We agree that the district court correctly made the three-fold determination in question.

It is clear from the opinion of the district court that it viewed the issue of patent validity as much more serious than the issue of infringement. And the great bulk of the opinion is devoted to a discussion of the various aspects of the validity issue.

At the outset the district judge recognized that the essentials of patentability are invention or discovery, usefulness and novelty. 35 U.S.C. § 101. It was also recognized that a patent is presumptively valid, and that the burden of proving invalidity of a patent by at least substantial evidence is upon the party who asserts it. 35 U.S.C. § 282; *Woodstream Corp. v. Herter's, Inc.*, 446 F.2d 1143, 1149-50 (8th Cir. 1971); *L. & A. Products, Inc. v. Britt Tech Corp.*, 365 F.2d 83, 86 (8th Cir. 1966).

Section 282 of Title 35 not only specifies that a patent is presumptively valid, it also sets out the defenses that are generally available in suits for patent infringement. Those defenses are: (1) Non-infringement, lack of responsibility for infringement, or unenforceability; (2) invalidity of the patent or of any particular claim in suit on any ground specified in Part II of the Patent Act as a

condition of patentability; (3) invalidity of the patent or claim for noncompliance with § 112 or § 251; and (4) any other fact or act made a defense under the Act.

Basically, the position of the defendants is that the Schiltz patent does not meet the conditions of patentability set out in 35 U.S.C. § 102(a) and (g) since the invention was anticipated by the prior art; that the condition set out in § 103 was not met because the invention was "obvious" in the light of the prior art; and that the specification of the patent application did not set out the best mode for the carrying out of the invention as required by § 112. It is further contended that the patent is invalid or unenforceable because of acts or omissions of the applicant in the prosecution of the application before the Patent Office. And still another contention is that the patentee was not the true inventor of the patented device.

All of those contentions, and perhaps others, were considered in detail by Judge Nichol and were rejected by him. We can add nothing of substance to what he has said. We agree with counsel for plaintiff that the questions before the trial court were essentially factual, that the findings of the trial judge have adequate evidentiary support, and that he divined correctly the governing legal principles.

The judgment of the district court is affirmed, and the case is remanded for a determination of the amount of damages to which plaintiff is entitled.

A true copy.

Attest:
CLERK, U. S. COURT OF APPEALS, EIGHTH CIRCUIT.

Jan. 17, 1967 B. D. SCHILTZ 3,298,550

HAYSTACK TRANSPORTING DEVICE

Original Filed April 6, 1964 4 Sheets-Sheet 1

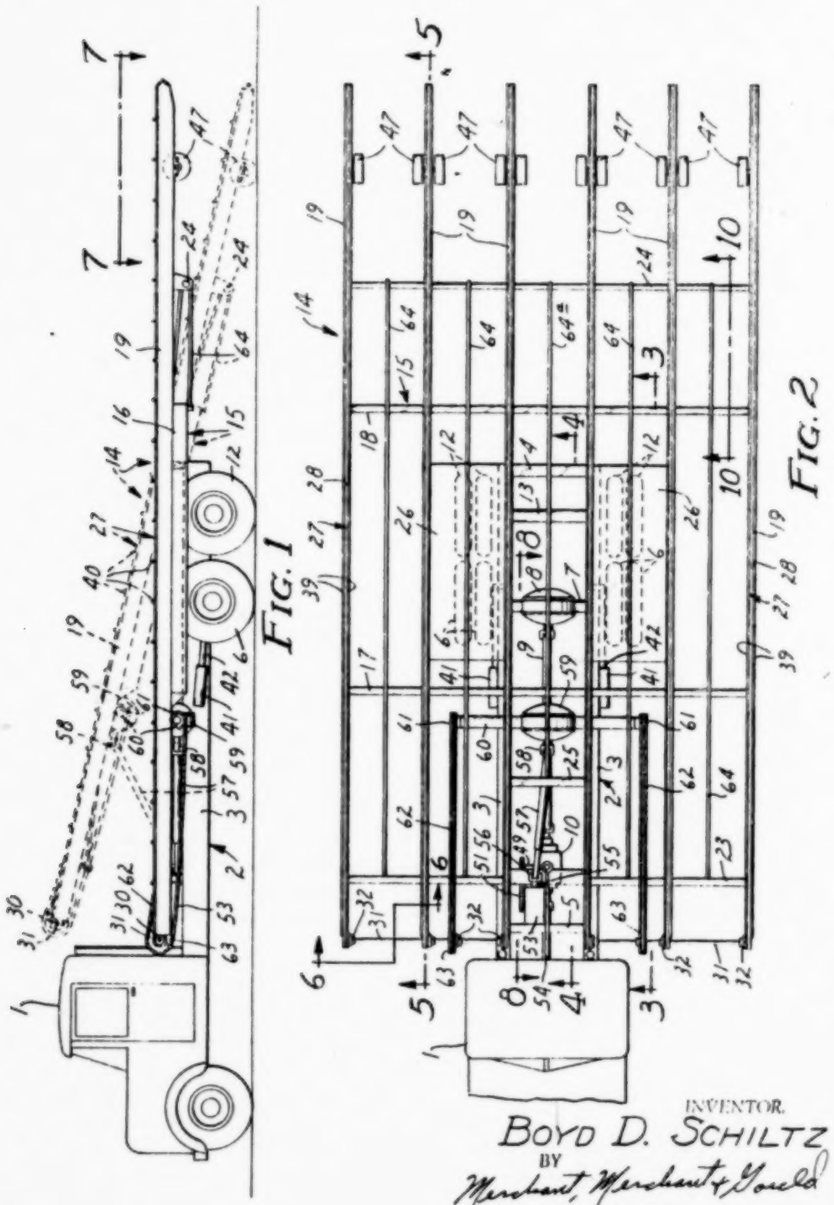

FIG. 1

FIG. 2

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Jan. 17, 1967 B. D. SCHILTZ 3,298,550

HAYSTACK TRANSPORTING DEVICE

Original Filed April 6, 1964 4 Sheets-Sheet

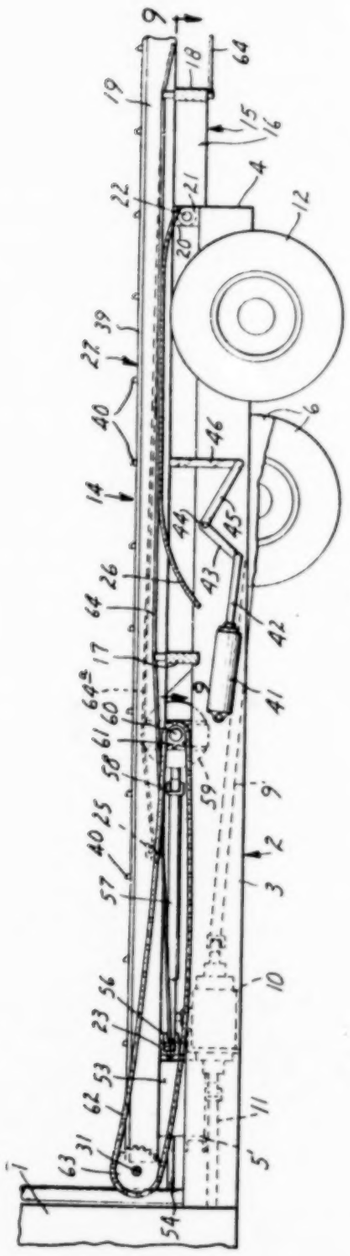

FIG. 3

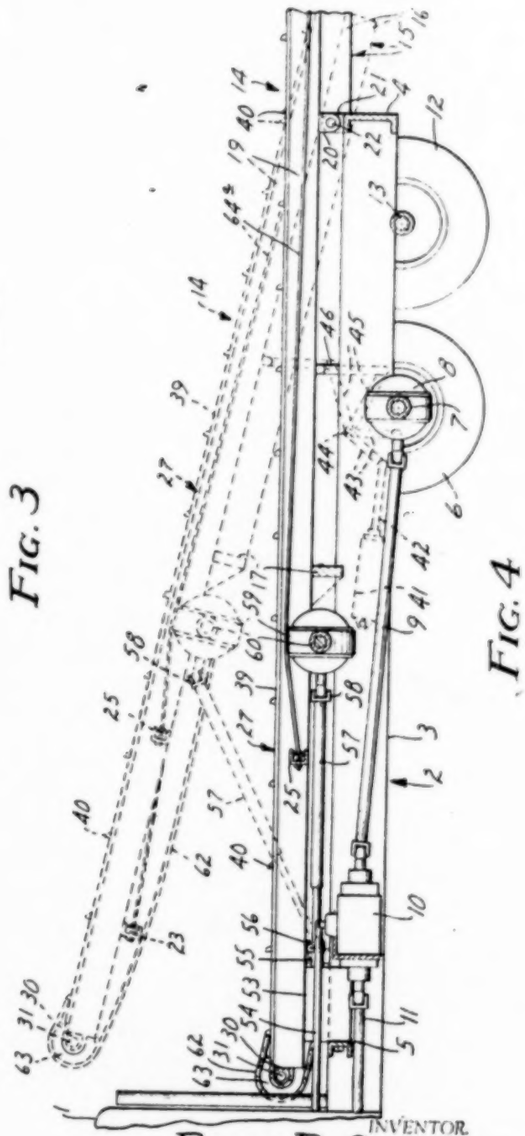

FIG. 4

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Jan. 17, 1967 B. D. SCHILTZ 3,298,550

HAYSTACK TRANSPORTING DEVICE

Original Filed April 6, 1964 4 Sheets-Sheet 3

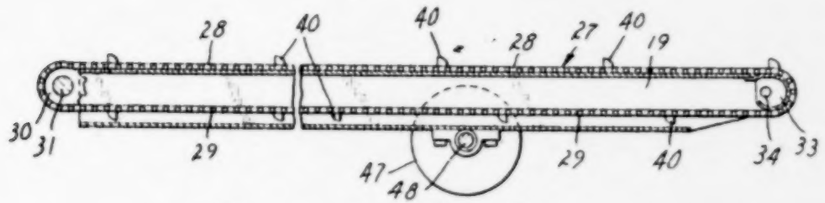

FIG. 5

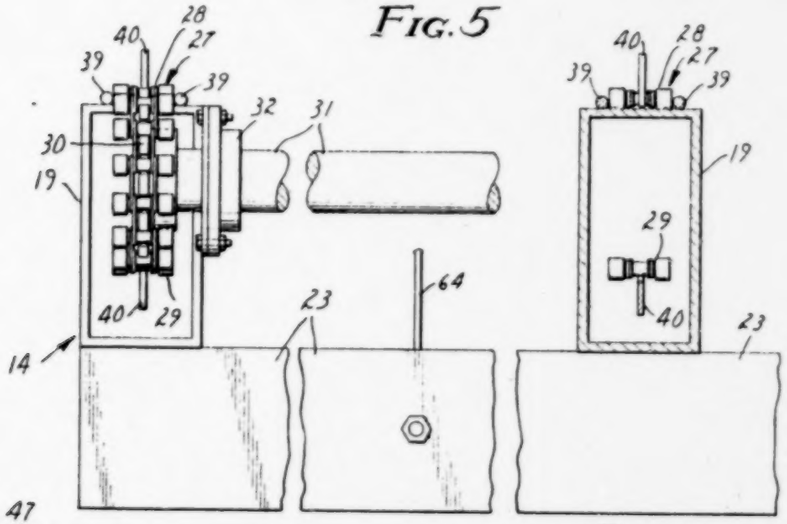

FIG. 6

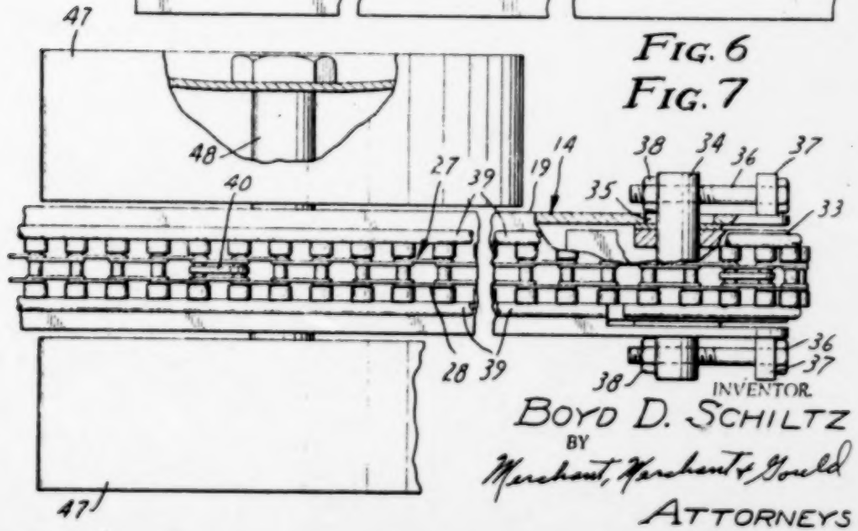

FIG. 7

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Jan. 17, 1967 B. D. SCHILTZ 3,298,550

HAYSTACK TRANSPORTING DEVICE

Original Filed April 6, 1964 4 Sheets-Sheet 4

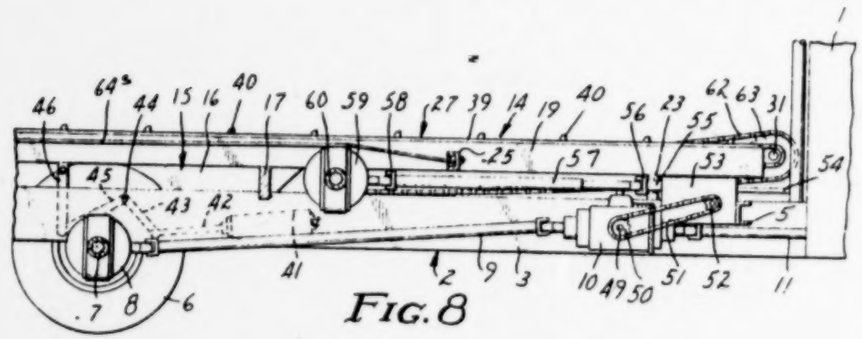

FIG. 8

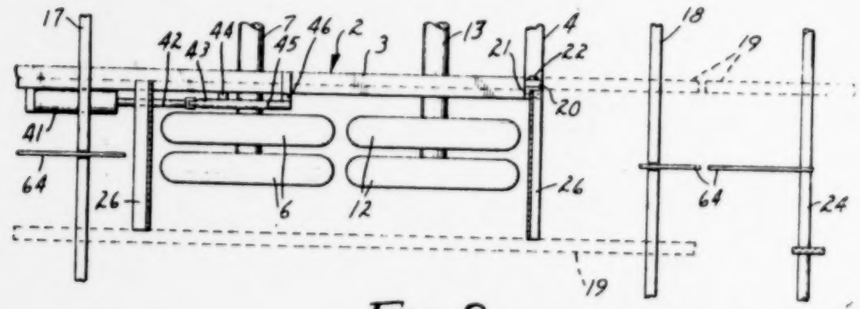

FIG. 9

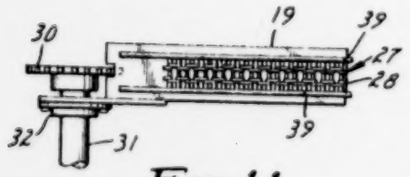

FIG. 11

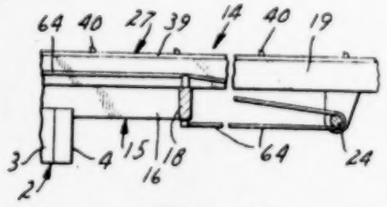

FIG. 10

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United States Patent Office

3,298,550

Patented Jan. 17, 1967

3,298,550
HAYSTACK TRANSPORTING DEVICE

Boyd D. Schiltz, Vayland, S. Dak., assignor to Daffin Corporation, Hopkins, Minn., a corporation of Delaware

Continuation of application Ser. No. 357,433, Apr. 6, 1964. This application May 25, 1966, Ser. No. 559,657

11 Claims. (Cl. 214—505)

This application is a continuation of my co-pending United States patent application filed Apr. 6, 1964, Ser. No. 357,433 and entitled Haystack Transporting Device, now abandoned.

This invention relates generally to loading and transporting vehicles and implements, and more particularly it relates to a novel transporting device for haystacks.

While devices of the general character described herein have previously been known, the same have not produced optimum satisfaction in their operation and results; and the present invention comprehends a mobile machine for transporting haystacks which comprises an important improvement and advancement over the previously known structures, both as to the efficiency derived from the structural differences and the improved operating results and advantages. Previously known types of haystack transporting devices have normally utilized a winch device with cables for pulling the haystack onto and off of the bed or platform of the implement. Such mechanisms have not only been time consuming and laborious in their operation, but have also normally been characterized by a tendency to tear up or disarrange the stack. Further, the cables used on previous structures have been known to break under tension and therefore present a safety hazard.

With the above-noted problems and disadvantages of previously known devices in mind, an important object of the present invention is the provision of a mobile machine for transporting haystacks which eliminates the necessity for a winch and cable mechanism and provides convenient means for loading, transporting and unloading haystacks without disarrangement thereof.

Another object of the present invention is the provision of a mobile machine for transporting haystacks which includes novel means whereby the bed or supporting platform of the machine is tilted and moved in one direction, when loading, to proceed under the stack whereas the load supporting surfaces of the bed are moved in an opposite direction and at a rate generally equal to the rate of bed movement to load the stack onto the bed or platform.

Another object of the present invention is the provision of a mobile machine for transporting haystacks which is constructed to overcome the loading resistance normally encountered when attempting to load the stack onto the platform or bed assembly.

Another object of the present invention is the provision of a mobile machine for transporting haystacks which includes a tiltable bed assembly provided with a plurality of coaxially disposed rotary wheels carried by the rear end portion of the bed assembly for supporting the same when in its inclined position for movement under the haystack to be loaded.

Another object of the present invention is the provision of a mobile machine for transporting haystacks which is designed and constructed for simplicity of operation, and which is particularly designed for operation by one person.

The above and still further objects and advantages of the present invention will become apparent from a consideration of the following detailed specification, attached claims and appended drawings.

Referring to the drawings, wherein like reference characters indicate like parts or elements throughout the several views:

FIG. 1 is a view in side elevation showing the novel machine of the present invention, with alternative positions of some parts being shown in dotted lines;

FIG. 2 is a view in top plan with a front portion of the machine being broken away;

FIG. 3 is an enlarged view in section taken approximately on the line 3—3 of FIG. 2;

FIG. 4 is an enlarged view in section taken approximately on the line 4—4 of FIG. 2, with alternative positions of some parts being represented by dotted lines;

FIG. 5 is an enlarged view in section taken on the line 5—5 of FIG. 2, some parts being broken away;

FIG. 6 is an enlarged view in section taken approximately on the line 6—6 of FIG. 2, some parts being broken away;

FIG. 7 is an enlarged partial plan view as seen from the line 7—7 of FIG. 1, some parts being broken away;

FIG. 8 is an enlarged view in section taken approximately on the line 8—8 of FIG. 2;

FIG. 9 is a view in horizontal section taken approximately on the line 9—9 of FIG. 3, some parts being broken away;

FIG. 10 is an enlarged view in section taken on the line 10—10 of FIG. 2; and

FIG. 11 is an enlarged view in plan showing details of the forward end portion of one of the elongated support members and the conveyor chain carried thereby.

Referring to the drawings, and particularly FIGS. 1–4 thereof, the haystack transporting machine of the present invention is mounted on a long bed truck. The truck cab is represented by the reference numeral 1, and the truck further comprises a rearwardly extending chassis frame, represented generally by the reference numeral 2. The truck frame 2 comprises rearwardly extending elongated frame members 3, a rear cross member 4 and a front cross member 5. A plurality of rear wheels are carried by the frame 2, and the front set of rear wheels 6 are mounted on a common axle structure 7 driven through the medium of a differential 8, a drive shaft 9 and an auxiliary truck transmission 10 used to further reduce the speed on the truck. The truck auxiliary transmission 10 is driven by a shaft 11 extending rearwardly from the regular truck transmission, not shown. With this arrangement, drive means is provided for imparting generally longitudinally directed movements to the truck and haystack transporting mechanism relative to the ground.

The rear set 12 of rear wheels is mounted on the frame members 3 by means of a common axle 13. It will of course be appreciated that since the particular construction of the truck is not a specific feature of the present invention, further showing and description thereof is omitted. It should also be noted that the present invention may also be utilized in combination with a trailer implement to be pulled by a tractor or other towing vehicle, and the showing and description of the truck is intended to merely illustrate a particular arrangement which has been found satisfactory. Plates in the nature of fenders 26 are secured to the bed frame 15 and disposed above the rear wheels 6, 12.

The present invention comprises a bed assembly, represented generally by the reference numeral 14, which extends generally longitudinally with the truck frame 2. The bed assembly 14 comprises a bed frame 15 which includes side rails 16, a front cross rail 17 and a rear cross rail 18. The box-like bed frame 15 of the bed assembly 14 supports a plurality of laterally spaced generally parallel and longitudinally extending support members 19. The support members 19 are rigidly secured to the bed frame 15, as by welding or the like, not shown.

As shown in FIG. 6, the support members 19 are box-shaped in cross section, but it will of course be appreciated that other suitable designs for the support members 19 may be substituted, such as for example an I-beam or channel iron construction. The bed assembly 14 is secured or mounted to the rear end portion of the truck frame 2 about a generally horizontal transversely extending axis for tilting movements between a horizontal load transporting position, represented by full lines in FIGS. 1 and 4, and an upwardly and forwardly inclined position, represented by dotted lines in FIGS. 1 and 4. The bed assembly 14 is mounted in this manner by means of a pair of laterally spaced depending bearing brackets 20 and a pair of aligned and cooperating upstanding brackets 21 on the frame 2. The bearing brackets 20, 21 are connected by pivot pins 22.

In order to strengthen the bed assembly 14, the same further comprises a plurality of cross members 23 and 24. The bed assembly 14 is provided with a plurality of endless conveyor chains 27 each one of which is mounted for movement on a different one of the support members 19 to define an upper flight 28 and a lower flight 29 and with the upper flights 28 being adapted to carry hay onto and off of the bed assembly 14, as will be particularly described hereinafter. As shown particularly in FIGS. 5, 6 and 8, the forward end portions of the conveyor chains 27 are mounted on generally coaxially disposed sprockets 30. The sprockets 30 are secured on a pair of axially spaced and aligned drive shafts 31. The drive shafts 31 are mounted with respect to the end portions of the elongated support members 19 by means of suitable bearing blocks 32.

As shown particularly in FIG. 7, the rear end portions of the conveyor chains 27 are entrained around rear shoes 33 the shafts 34 of which are mounted for generally longitudinally directed adjustable movements with respect to the rear end portions of the support members 19. The opposite end portions of the shoe shafts 34 project through aligned apertures, one of which is shown at 35, in the side walls of the support members 19, and the opposite end portions of the shafts 34 are carried by adjustment bolts 36 which are mounted in projecting ears 37 on the side walls of the support members 19. With this arrangement, the conveyor chains 27 may be adjusted to the desired degree of tension by turning the adjustment nuts 38 on the bolts 36.

The upper flights 28 of the conveyor chains 27 are disposed for movement within guideways defined by laterally spaced guide rods 39 secured to the upper walls of the elongated support members 19, as shown particularly in FIGS. 5–7. The lower return flights 29 of the conveyor chains 27 are disposed within the hollow interiors of the box-like support members 19, as shown particularly in FIG. 6. The conveyor chains 27 as illustrated are of the roller chain type so as to aid in the reduction of friction. However, it will be appreciated that virtually any type of endless flexible conveyor belt or chain may be utilized in accordance with the present invention. The conveyor chains 27 are provided with outwardly extending longitudinally spaced hook-like teeth 40 provided for the purpose of increasing the gripping or grabbing efficiency of the chains 27 with respect to the hay.

Referring particularly to FIGS. 4 and 9, it will be noted that a lifting mechanism is provided for elevating the bed assembly 14 from its horizontal position to its above-described inclined position. Such lift mechanism for each side of the bed assembly 14 comprises a fluid pressure operated cylinder 41, the piston rod 42 of which is pivotally connected to a first crank arm 43 rigidly secured to a rock shaft 44. A second crank arm 45 rigidly secured to the rock shaft 44 in circumferentially spaced relation to the first crank arm 43 is pivotally connected to one end portion of a third crank arm 46, the other end portion of which is also pivotally connected to the bed assembly 14. As specifically shown in FIGS. 3 and 9, the

crank arms 43, 45 are formed in a unit on the nature of a bell crank. As shown in FIG. 4, the various positions of the crank arms 43, 45 and 46 corresponding to the horizontal and inclined positions of the bed assembly 14 are illustrated therein. When the bed assembly 14 is in its inclined position shown particularly in FIGS. 1 and 4, the rear end portions of the support members 19 are disposed in close relationship to the ground, and when the machine is backed toward or into a haystack, not shown, the support members 19 are adapted to act as tines moving under the haystack. In order to increase the efficiency with which the support members 19 may move under the haystack and also to provide support for the rear end portions of the support members 19, a plurality of rotary wheels 47 are carried by the rear end portions of the support members 19 for supporting the same when the bed assembly 14 is in its inclined position. As shown particularly in FIG. 7, a pair of the wheels 47 are provided for each of the intermediate support members 19, with the same being pivotally mounted on a common shaft 48 and one each disposed on an opposite side of such support members 19. However, as shown in FIG. 2, the outside support members have only a single wheel 4 on the inner side thereof.

Having noted that means must be provided in accordance with the present invention for moving the conveyor chains in unison on the support members 19, it will be appreciated that various suitable driving arrangements may be provided to accomplish such movement. However, as particularly illustrated in the drawings, the auxiliary truck transmission 10 is provided with a power take-off mechanism within the housing of the transmission 10 and not shown and having a power shaft 49 which has a driven sprocket 50 connected by means of a drive chain 51 to the sprocket 52 of the second transmission mechanism 53, as shown particularly in FIG. 8. The second transmission mechanism 53 is used to regulate the speed of the endless conveyor chains 27. It is also noted that the auxiliary truck transmission 10 is provided with a shift lever 54 for actuating the power shaft 49. The sprocket 52 drives the input shaft of the second transmission 53, and the same is also provided with an output shaft 55 having a universal joint 56 connected to an elongated drive shaft 57. The drive shaft 57 is formed in two telescoping portions so that the same may be elongated when the bed assembly 14 is moved to the tilted position, as shown in FIG. 4. The other end portion of the drive shaft 57 is connected by means of a universal joint 58 to the differential 59 of a rear axle assembly 60. The opposite axle shafts of the rear axle assembly 60 are in turn provided with sprockets 61 on which are entrained endless chains 62 for driving a pair of sprockets 63 each one of which is secured to a different one of the conveyor chain drive shafts 31. It is noted that the sprockets 63 are of a larger diameter than the sprockets 61 on the rear axle assembly 60 so as to provide a further speed reduction. It will be noted that the drive mechanism for the conveyor chains 27 is so connected to the drive means for the truck rear wheels 6 that the upper flights 28 of the conveyor chains 27 will be moving in a direction opposite to the generally longitudinally directed movement of the truck and transport mechanism. For example, when the bed assembly 14 is moved to its tilted position and moved in the direction to proceed under the haystack, the upper flights 28 of the conveyor chains 27 are moving in an opposite forward direction so as to load or lift the haystack onto the bed assembly 14. Conversely, when it is desired to unload the haystack from the transport device of the present invention, and the shift lever 54 is actuated to drive the second transmission mechanism 53 in cooperation with the truck transmission 10, the truck is moved in a forward direction by its driving rear wheels 6 and the upper flights 28 of the conveyor chains 27 are moved in an opposite generally rearward direction so as to unload the haystack onto the ground behind the transport device as the same pulls away from the un-

loading position. The rate of horizontal movement of the conveyor chains 27 should be generally equal to the rate of truck movement in the opposite direction. Since the chains 27 are inclined when loading and unloading, the specific rate of chain movement may be slightly greater than the rate of truck movement in order to provide generally equal rates of relative movement in horizontal directions.

In order to provide supporting surfaces or members disposed intermediate the spaced elongated support members 19 of the bed assembly 14 for providing additional load bearing surfaces for the haystack, a plurality of cable lengths 64 are connected intermediate the front cross members 23 and rear cross member 24 of the bed assembly 14. The forward end of a center cable 64*a* is secured to a short cross member 25 of the bed assembly 14, with the rear portion thereof connected to the rear cross member 24. The ends of the cables 64, 64*a* are returned and secured to the rear cross rail 18. The cable lengths 64 may be secured in any suitable manner, such as by welding, cable clamps or the like. It will also be appreciated that other suitable support stringers may be substituted for the cable lengths 64, such as elongated lengths of lumber or steel bars of various configurations.

Having the above description of the present invention in mind, it will be appreciated that important features thereof reside in the provision of means whereby the bed assembly 14 is tilted and moved in a direction to proceed under the haystack whereas the load supporting surfaces of the bed assembly 14 are moved in an opposite direction to load the stack onto the bed assembly 14, the stack being in effect elevated onto the bed assembly 14 without any appreciable horizontal movement or disarrangement of the stack. This cooperation of movements in opposite directions, along with the provision of the rotary supporting wheels 47 at the rear end portions of the support members 19, provide an extremely efficient assembly for overcoming the normal loading resistance encountered when attempting to move the bulky haystacks.

This invention has been tested and found to be completely satisfactory for the accomplishment of the previously noted objects; and while a preferred embodiment, in which the principles of the present invention have been incorporated, has been shown and described herein, it should be specifically understood that the same may be modified without departure from the scope and spirit of the appended claims.

What is claimed is:

1. A mobile machine for transporting haystacks and comprising:
- (a) an elongated frame,
- (b) drive means for imparting generally longitudinally directed movements to said machine relative to the ground,
- (c) an elongated bed assembly extending longitudinally of said frame,
- (d) means mounting said bed assembly on said frame for tilting movements between an inclined position, wherein the bed assembly is adapted for movement with said machine and under a haystack for loading and unloading of a haystack onto said bed assembly, and a horizontal load transporting position,
- (e) said bed assembly including a plurality of laterally relatively widely spaced longitudinally extending support members each having a transversely relatively narrow top supporting surface,
- (f) a plurality of endless conveyor chains each one mounted for conveying movement on a different one of said support members to define upper and lower flights and with the upper flights each being supported on its respective supporting surface and adapted to carry hay onto and off of said bed assembly as the bed assembly is moved under a stack, and
- (g) second drive means connected to said first drive means and operative to impart concerted movement

to the upper flights of said conveyor chains in a direction opposite to the direction of the generally longitudinal movement imparted to said machine by said first drive means and also at a rate greater than said machine movement, whereby the haystack is moved as a unit onto the tilted bed.

2. A mobile machine for transporting haystacks and comprising:
- (a) an elongated frame,
- (b) drive means for imparting generally longitudinally directed movements to said machine relative to the ground,
- (c) an elongated bed assembly extending longitudinally with said frame,
- (d) means mounting said bed assembly on said frame about a generally horizontal transversely extending axis for tilting movements between a horizontal load transporting position and an upwardly and forwardly inclined position wherein the rear end portion of said bed assembly is disposed close to the ground for loading and unloading of a haystack onto said bed assembly and wherein the bed assembly is adapted for movement with the frame and under a haystack,
- (e) means for tilting said bed assembly between its said horizontal position and its inclined position,
- (f) said bed assembly including a plurality of laterally relatively widely spaced longitudinally extending support members each having a transversely relatively narrow top supporting surface.
- (g) a plurality of endless conveyor chains each one mounted for conveying movement on a different one of the support members to define upper and lower flights and with the upper flights each being supported on its respective top supporting surface and adapted to carry hay onto and off of said bed assembly as the bed assembly is moved under a stack, and
- (h) second drive means connected to said first drive means and operative to impart concerted movements to the upper flights of said conveyor chains in a direction opposite to the direction of the generally longitudinal movement imparted to said machine by said first drive means and also at a rate greater than said machine movement, whereby the haystack is moved as a unit onto the tilted bed.

3. The structure defined in claim 2 in further combination with a plurality of rotary wheels carried by the rear end portion of said bed assembly for supporting the same when in its said inclined position.

4. The structure defined in claim 3 in which said conveyor chains include rollers engaging the associated support members to reduce the power requirements for driving said chains.

5. A mobile machine for transporting haystacks and comprising:
- (a) an elongated frame,
- (b) drive means and transmission mechanism for imparting generally longitudinally directed movements to said machine relative to the ground,
- (c) an elongated bed assembly extending longitudinally with said frame,
- (d) means mounting said bed assembly on said frame for tilting movements between a horizontal load transporting position and an inclined position for loading and unloading of a haystack onto said bed assembly and wherein the bed assembly is adapted for movement with the frame and under a haystack,
- (e) said bed assembly including a plurality of laterally relatively widely spaced longitudinally extending support members each having a transversely relatively narrow top supporting surface,
- (f) a plurality of endless conveyor chains each one mounted for conveying movements on a different one of said support members to define upper and lower flights and with the upper flights each being sup-

ported on its respective top supporting surface and adapted to carry hay onto and off of said bed assembly as the bed assembly is moved under a haystack, said endless chains being operatively coupled to a common drive shaft, and

(g) second drive means connected to said first drive means and operative to impart concerted movement to the upper flights of said conveyor chains in a direction opposite to the direction of generally longitudinal movement imparted to said machine by said first drive means and also at a rate greater than said machine movement whereby the haystack is moved as a unit onto the tilted bed, said second drive means comprising:

(1) a power takeoff from said transmission mechanism of said first drive means, and

(2) a second transmission mechanism connected to said power takeoff and driven thereby and further connected to said common drive shaft of the conveyor chains.

6. The structure defined in claim **1** in which each of said support members defines a passage extending longitudinally thereof, the lower flight of each conveyor chain being disposed longitudinally within the passage of its respective support member.

7. The structure defined in claim **1** in which said bed assembly includes a plurality of elongated narrow support elements each extending longitudinally of said bed assembly between adjacent ones of said support members, said support elements being disposed adjacent the horizontal plane of the top surfaces of said support members and cooperating therewith and said upper conveyor chain flights to provide the sole hay-engaging portions of said machine.

8. A mobile machine for transporting haystacks and comprising:

(a) an elongated frame,

(b) drive means for imparting generally longitudinally directed movement to said machine relative to the ground,

(c) an elongated bed assembly extending longitudinally of said frame,

(d) means mounting said bed assembly on said frame for tilting movements between an inclined position wherein the bed assembly is adapted for movement with said machine and under a haystack for loading and unloading of a haystack onto said bed assembly, and a horizontal load transporting position,

(e) said bed assembly including a plurality of laterally spaced longitudinally extending support members,

(f) a plurality of laterally spaced endless conveyor elements one each mounted on a different one of at least some of said support members each having upper and lower flights, the upper flights overlying their respective support members and being adapted to carry hay onto and off of said bed assembly as it is moved under a stack,

(g) a plurality of longitudinally spaced hay-engaging teeth on each of said conveyor elements,

(h) and second drive means operative to impart concerted movement to the upper flights of said conveyor elements in a direction opposite to the direction imparted to said machine by said first-mentioned drive means and at a rate to move the hay carried thereby at a speed greater than the machine movement imparted by the first mentioned drive means.

9. A mobile machine for transporting haystacks according to claim **1** in further combination with a plurality of longitudinally spaced hay-engaging teeth on each of said conveyor elements.

10. A mobile machine for transporting haystacks and comprising:

(a) an elongated frame,

(b) drive means for imparting generally longitudinally directed movement to said machine relative to the ground,

(c) an elongated bed assembly extending longitudinally of said frame,

(d) means mounting said bed assembly on said frame for tilting movements between an inclined position wherein the bed assembly is adapted for movement with said machine and under a haystack for loading and unloading of a haystack onto said bed assembly, and a horizontal load transporting position,

(e) said bed assembly including a plurality of laterally spaced longitudinally extending support members,

(f) a plurality of laterally spaced endless conveyor elements one each mounted on a different one of at least some of said support members, and each having upper and lower flights, the upper flights overlying their respective support members and being adapted to carry hay onto and off of said bed assembly as it is moved under a stack,

(g) a plurality of longitudinally spaced hay-engaging teeth on each of said conveyor elements,

(h) and second drive means operative to impart concerted movement to the inclined upper flights of said conveyor elements in a direction opposite to the direction imparted to said machine by said first-mentioned drive means and at a rate on the incline such that said flights have a horizontal component of movement generally equal to the rate of machine movement.

11. The mobile machine defined in claim **10** in which said bed assembly includes a bed frame, said support members having upper surfaces disposed in a plane in overlying spaced relation to said bed frame, said upper flights of the conveyor elements being supported by said top surfaces of the support members.

References Cited by the Examiner

UNITED STATES PATENTS

3,209,932 10/1965 Schiltz ---------- 214—508 X

GERALD M. FORLENZA, *Primary Examiner.*

A. J. MAKAY, *Assistant Examiner.*

* * * * *

[R. 48] As far as the chains and the beams and drive means and so on, these aren't new elements. As I'm reminded of someone that was talking about a combination of elements and patents, [R 49] and pointing out in the prior art where this element was and that element was, and his response was: I don't need to go to the prior art to find those; I can go to a hardware store; you can go to a junkyard and find chains and beams and frames, and so on, so there was no missing ingredient.

* * * * *

Q. Mr. Wolfe, do you find any reference in the Bruce patent relative to loading or transporting various types of forage materials?

A. It very definitely indicates straw, also indicates that it can be deposited in small amounts after it is on the unit or it can be unloaded as a whole.

Q. What you are saying then is where Claim 10 calls for transporting a haystack, you are saying that Bruce calls for moving straw or straw stacks, is that what you are saying?

A. Manure straw and similar forage, I believe.

[T 606] Mr. Siegfried: Any objection with that qualification?

Mr. Gould: Well, I still object to the foundation—

(Argument between Court and counsel where the Court overrules the objection stating that Mr. Gould may have a standing objection to all questions concerning the Bruce patent, that the same does not correspond to the Schiltz patent in that it is essentially not a device for the moving of haystacks)

Q. Mr. Wolfe, do you find that the Bruce patent is a machine for moving a straw stack? A. Yes.

Q. Does the Bruce patent Number 1628871 have structure disclosed which respond to "an elongated frame", Paragraph A of Claim 10 of the patent?

A. Yes.

Q. Can you point that out for the Court what the elongated frame is and identify the reference numeral and the figure number?

A. Referring to Figure 1, the seat 18, part of frame 19, the eveners 20 and 21, plus the longitudinal member 17 and the head rail 11, plus the two side bars 13 I would consider an elongated frame.

Q. I believe you mentioned 20, and I think if you were [T 607] to reevaluate the statement in the patent you may find that is directed to draft animals. Do you want to include that as part of the elongated frame,

A. Well, I don't think it makes any difference. We can leave it out then.

Q. Will you mark that then with a letter "a" to the various parts you just identified?

A. I'm marking number 18 with an "a", number 19 with an "a", number 17 with an "a" and number 11 with an "a" and the two side bar numbers 13 with an "a".

Q. Do you then find that the Bruce patent has structure which respond to claim element by calling for a drive means for imparting generally longitudinally directed movement to said machine relative to the ground?

A. I would consider the eveners and the draft animals as providing this drive.

Q. This is really horsepower you are talking about now?

(Discussion between Court and counsel about horsepower)

Q. Mr. Wolfe, do you find that the Bruce patent has structure which responds to Paragraph C of Claim 10 calling for elongated bed assembly extending longitudinally of said frame?

[T 608] A. Yes. I would consider what he calls a platform consisting of the teeth 12 to be a bed assembly with a plurality of teeth or beams on them.

The Court: Is he referring to Element C?

Mr. Siegfried: Yes, sir.

The Court: And 12 being equivalent to Element C?

Mr. Siegfried: Yes.

Q. Would you mark with a "c" then those elements which I believe you said would be 12 identified?

A. I'm marking Figure 1, number 12, "c".

Q. And Mr. Wolfe, do you find structure in the Bruce patent that responds to Paragraph D of Claim 10 calling for means mounting said bed assembly on said frame for tilting movements between an inclined position wherein the bed assembly is adapted for movement with said machine and under a straw stack for loading and unloading of a straw stack onto said bed assembly, and a horizontal load transporting position?

A. I do not find the exact tilting mechanism referred to in the patent Element D, but I do find elements which provide the same purpose.

Q. What are those?

[T 609] A. And those are the wheels, number 15, Figure 1; the axle number 14 in Figure 2 and the slot, the longitudinal slot labeled 12-A as the elements that will perform this function. They operate in this manner. The wheels shown in Figure 1, 15, would be the position for loading with the teeth contact or close contact to the ground, and as the machine is pulled back or reversed the wheels move forward in the slot 12-A to the position at a forward or out near the end of the teeth, end of that slot, and as this is being done it raises the teeth off the ground for transportation.

Q. Does that then provide the tilting action you were talking about?

A. It is very similar to the tilting action.

The Court: I don't find the 12-A?

A. In Figure 2, sir, right about in the middle on the lower part.

Q. Does that slot in each of those members 12 and 13?

A. Yes.

Q. Is there some figures that shows, some figure in the patent that shows the machine in a so-called transport position and the load position?

A. Yes. Referring to Figure 7 shows the wheels in the [T 610] load position, referring to Figure 9 it shows the wheels in the transport position.

Q. Mr. Wolfe, would you then label with the small letter "d" the elements you have just made reference to?

Mr. Gould: Object to that. The witness has not testified, he does not find the tilting mechanism referred to in the patent and the witness has not testified to any tilted position in the unloading position as called for in Element D. (Discussion between Court and counsel, the Court saying he concedes that there is no unloading mechanism other than mechanism that does perform the same function and with that understanding I will overrule the objection)

Q. Have you marked those, Mr. Wolfe, with the small letter "d"?

A. Okay. I am labeling number 15, Figure 1, with a "d". The shaft number 14 in Figure 2 with a "d". The slot 12-A in Figure 2 with a "d". Now it might be well to label wheels 15 and axle 14 in both Figures 7 and 9 with a "d".

Q. Mr. Wolfe, do you find disclosed in the Bruce Patent

structure responding to Element E of Claim 10 calling for said bed assembly including a plurality of laterally spaced longitudinally [T 611] extending support members?

A. Yes. I think the teeth, number 12, show plurality of laterally spaced longitudinally support members.

Q. Will you label those with the small letter "e" then?

A. I am labeling number 12, Figure 1, with the small letter "e".

Q. With respect to Paragraph F of Claim 10. Do you find a mechanism in the Bruce patent that responds to a plurality of laterally spaced endless conveyor elements one each mounted on a different one of at least some of said support members, and each having upper and lower flights, the upper flights overlying their respective support members and being adapted to carry hay onto and off of said bed assembly as it is moved under a stack? A. Yes.

Q. What are those elements that you found that respond to that language?

A. Figure 2, the chain number 30 on each one of the teeth would be a plurality of endless conveyors.

Q. Are they mounted on sprockets or something of that nature?

A. Then there is sprockets at each of the conveyor element. The sprocket number for the driving sprocket is number 29. The driving shaft is number [T 612] 28. The idler sprocket is number 25 and the idler shaft is number 24 on Figure Number 2.

Q. Mr. Wolfe, would you label those elements with the small letter "f"?

A. I am labeling number 30 chain, small letter "f", the drive shaft number 28 with a small letter "f", the drive sprocket 29 with a small letter "f", the idler sprocket 25,

small letter "f", and the drive shaft 24 with a small letter "f".

Mr. Gould: I wonder if 29 is a sprocket. You might want to correct that.

The Court: Yes, I was wondering what 29 was.

Mr. Siegfried: It looks like it might be a slot.

A. It's a slot. It is apparently called 29 as a sprocket on 26.

Mr. Siegfried: It's apparent patents usually have errors in them.

The Court: Really?

Mr. Siegfried: Yes. Usually they are obvious though.

Q. Mr. Wolfe—

Mr. Gould: Did we correct that. I think the sprocket—

[T 613] Mr. Siegfried: Yes. I think we should correct that. Is there a number for the sprocket?

A. It says in the written material sprocket 29.

Q. Mr. Wolfe, would you look at Figure 2 right under the figure number it appears to be 28-A. Does that refer to the sprocket?

A. Well, if it is, then it's numbered twice.

The Court: Well, it's referred to in here as the sprocket wheel. I don't know what the difference between a sprocket wheel and sprocket is?

Mr. Siegfried: Maybe Mr. Wolfe can tell us.

A. Well, I think it's a mistake because they are both the same sprocket. Wouldn't make any difference whether you call it a sprocket wheel or just a plain sprocket.

Mr. Siegfried: Well, there is a difference. Your Honor. I'm referring to Column 2, Line 23 where it says a sprocket wheel 2-A?

A. Yes, but down about three lines it says sprocket 29.

Q. Just above that it refers to slot 29.

(Discussion between Court, counsel and the witness [T 614] as to the marking of Exhibit 29 and comments by the Court)

A. I suppose the ideal thing is to change it to 28-A as being the drive sprocket.

Q. Mr. Wolfe, do you find mechanism in the Bruce patent that refers to a paragraph small "g", a plurality of longitudinally spaced hay-engaging teeth on each of said conveyor elements?

A. The patent does not mention the teeth.

* * * * *

[T 615] Q. You don't have any difficulty in finding teeth on the chain though, is that what you are saying, Mr. Wolfe?

A. That is right. It shows them drawn right on the chain.

[T 616] Q. Mr. Wolfe, if you do not have difficulty in finding the teeth on the chain would you with your red pencil mark a small "g" as to what you find responding to the hay-engaging teeth?

A. Figure 2, I am marking the small projection that extends up from the chain with a small letter "g".

Q. Mr. Wolfe, do you find a mechanism in the Bruce patent referred to as Element H of Claim 10 calling for a second drive means operative to impart concerted movement to the inclined upper flights of said conveyor elements in a direction opposite to the direction imparted to said machine by said first-mentioned drive means and at a rate on the incline such that said flights have a horizontal

component of movement generally equal to the rate of machine movement? A. Yes I do.

Q. Can you tell us what those elements are or structure [T 617] parts are?

* * * * *

[T 617] A. In Figure 3, number 15 the wheel in the solid position, loading position, and that wheel has a beveled gear number 16 mounted on it which in the rearward position meshes with the beveled gear and I believe that is 50 which is mounted on a shaft that drives a spur gear number 49 which is marked with a large spur gear number 48 which drives the shaft 47. Now, 47 is shown mainly on Figure 4 which in turn drives a beveled gear number 39 which drives shaft number 3 which has connected to it a series of gears 37 that operate in conjunction with the shaft solidly connected. Then there are an equal number [T 618] of gears, number 36, that are in mesh with the gears 37 and they all run individually. They can idle on the shaft. Now, referring to Figure 6, that shaft is number 32, and they can idle on that shaft. Built into that shaft is a sliding rod with a key that slides in a slot and by moving that rod and the key we can have it in a neutral position which would be all the way to the right, or we can connect it with any of the five gears number 36, and that key is called number 38 on Figure 6, thereby the operator can select any speed with this type of transmission. Then that shaft turns a sprocket and chain 31 which in turn is on the other sprocket there which turns shaft 28 which is the long drive shaft that goes across and drives all the drive sprockets for the endless conveyors. Now, when we move to the unloading position the wheel would be as shown in

Figure 3 in the dotted portion which would be wheel 15 again. That still has the bevel gear 16 mounted on it and in that position it engaged with a bevel gear 46 and runs through the shaft 45, I believe that is operating a spur gear 44, which is in mesh with a spur gear 43-A, mounted on a long shaft which comes back and is connected with bevel gear 40. Bevel gear 40 then drives [T 619] again bevel gear 39, but in the opposite direction. So this provides the proper direction of the chains for unloading, and again we run through this five speed transmission so that the operator can select a speed corresponding to his movement.

Q. Mr. Wolfe, are the chains on the bed or, if I may call it that, are they operating in a direction opposite to the direction imparted to the machine by the draft animals or whatever it is that is moving it?

A. Yes.

Q. And are all of the chains which I believe are labeled as number 30, are they all driven in the same direction at the same time and at relatively the same speed?

A. Yes. They are connected, all connected to this shaft 28 which extends across the front of the machine or close to the mounted end of the teeth and drives all of the chains at the same time.

Q. Then you would find that that drive means does impart a concerted movement to the inclined upper flights?

A. Right.

Mr. Siegfried: At this time, Your Honor, I believe we will offer Defendants'—

[T 620] A. Do we want to mark those?

Q. Yes. Will you please mark those first?

A. Figure 3 I'm marking 15 with a small "h", 16 with a small "h", 50 with a small "h", 49 with a small "h", 48

with a small "h", 51 with a small "h", and in Figure 4, marking 47 with a small "h", gears 41, 39 and 40 with a small "h"; shaft number 42 with a small "h", spur gear number 43 with a small "h", spur gear number 44 with a small "h" and shaft number 45 with a small "h"; bevel gear number 46 with a small "h". Then on Figure 34 with a small "h", then transmission 33 with a small "h" and gears 37 with a small "h"; gears 36 with a small "h", shaft number 32 with a small "h" and chain number 31 with a small "h". Shaft number 28 with a small "h". Then going to Figure 6, gears 36 with a small "h", shaft number 32 with a small "h", the key number 3 with a small "h". I think that completes it.

Q. Mr. Wolfe, did you mark element "b" on the drawing, small "h"? A. No, we didn't.

The Court: I didn't think you did either.

Mr. Siegfried: I suggest you place [T 621] the element or small letter "b" where you think the horsepower would be.

A. Well then, we'll mark the single figure 3, number 20 with a small "b".

Mr. Siegfried: I believe then at this time, Your Honor, the defendants will then offer Exhibit I-11.

The Court: This is with the understanding it's a four horsepower mechanism.

Mr. Gould: I thought it had been offered.

The Court: No it hadn't—

(Discussion between Court and counsel)

Mr. Gould: I will object to the exhibit as being offered and as marked by this witness with the letters representing his testimony.

The Court: Very well. The objection is overruled and Exhibit I-11 will be received in evidence.

Q. Sure. As a matter of fact, when we work on the gathering chains on a corn picker, you know how they gather the corn in, there is different gears left there to change those speeds, aren't there? A. Well, I think it is pretty well built into the machine. But, the speed is built into the machine.

Q. Sure, but the company always send out a couple extra gears in case you want to change that speed, different machine companies? A. I don't think they usually send out extra gears for that. It's built into the machine.

* * * * *

[T 1607] Q. Sure, we did, and we were cutting oats and oats was kind of down and we were cutting in low gear, we had that reel running pretty slow, didn't we?

A. I believe, Mr. Maynes, the ones I grew up with were all ground-driven so they ran the speed off the ground. But, some of them are power-driven and you can change the speed of them to fit the conditions available.

Q. And you change that speed so that the reel runs generally equal to the forward direction of the unit, don't you? A. Well, if you want to pick up grain you usually run it a little bit faster. But generally equal to it, yes.

Q. Matter of fact, the old binders, they had that old ten-foot International Harvester binder that I ran [T 1608] that had three sprockets on it, didn't it, to change? A. I don't know what the one you ran had on it. The one I ran was pulled by horses.

Q. But, in teaching engineering you don't teach your kids about the old horse binder, do you? A. No. We don't spend too much time on it.

Q. You kind of bring them up to date as things go along, don't you? A. I try to.

Q. You brought them up to date and you took a look at those new binders when they came out, didn't you?

A. Oh, I'm sure I did.

Q. Sure you did. And it was never considered a big problem to change the speed of that reel? A. No. I don't think it would be a big problem.

Q. Any more than it would be a big problem to change the speed of chains on the Bruce machine?

A. Probably about the same.

Q. Sure. As a matter of fact, you wouldn't even have to be an engineering student to do that, any farmer could do that? A. Oh, I'm sure he could.

* * * * *

May 17, 1927. W. E. BRUCE 1,628,871

FERTILIZER OR STRAW SPREADER

Filed Oct. 20, 1925 3 Sheets-Sheet 1

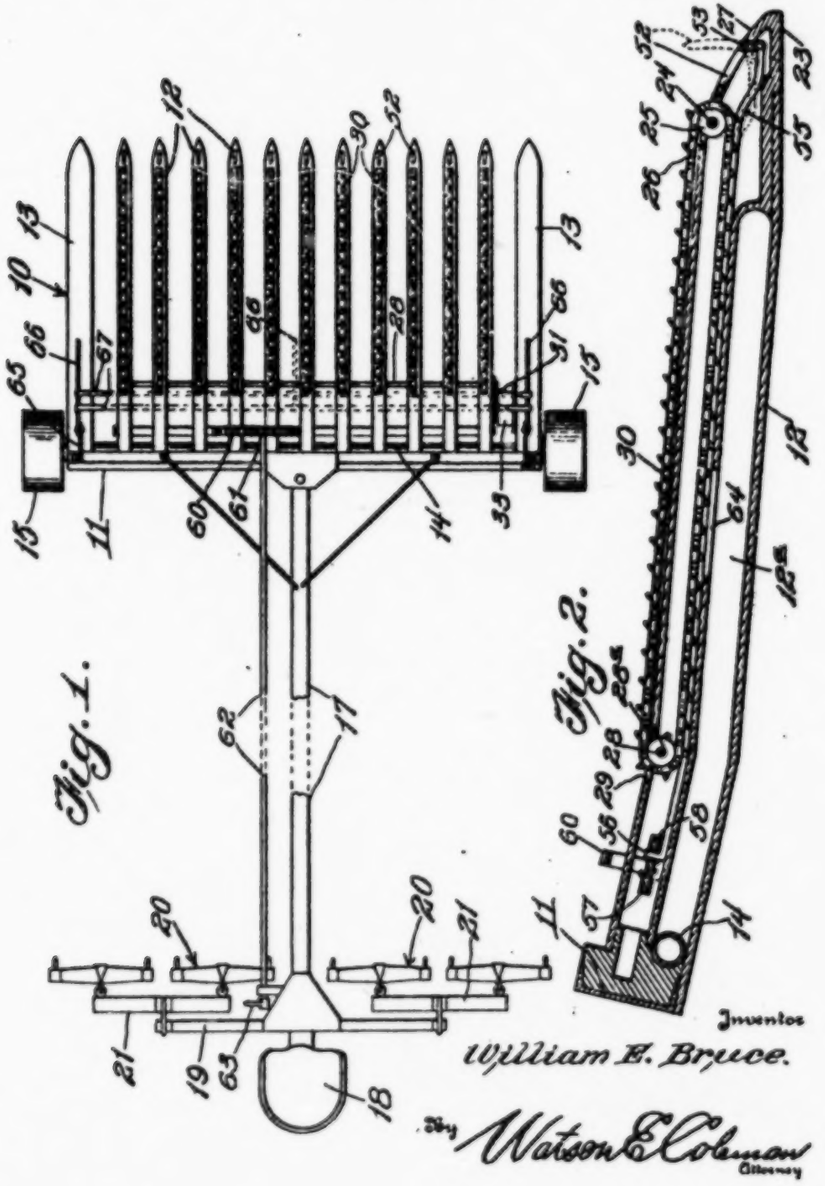

Fig. 1.

Fig. 2.

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May 17, 1927. W. E. BRUCE 1,628,871

FERTILIZER OR STRAW SPREADER

Filed Oct. 20, 1925 3 Sheets-Sheet 2

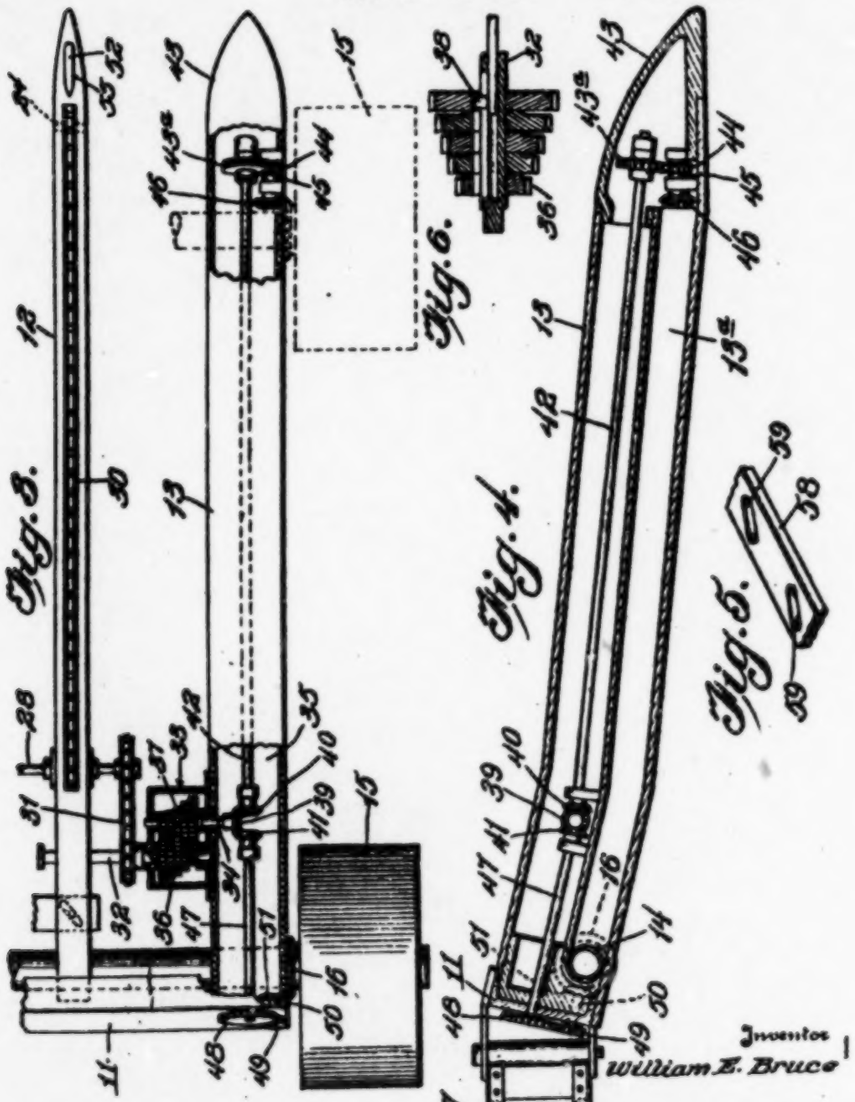

Fig. 3.

Fig. 6.

Fig. 4.

Fig. 5.

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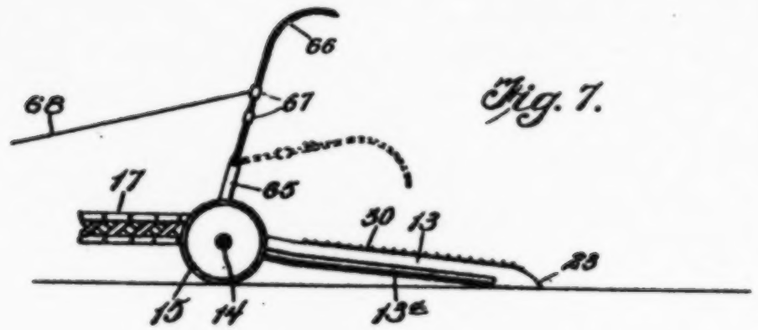

Fig. 7.

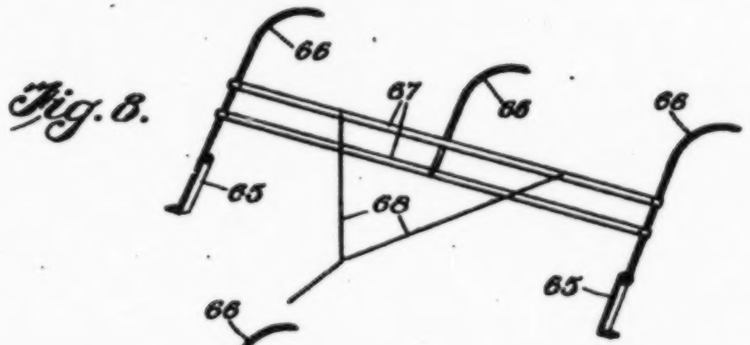

Fig. 8.

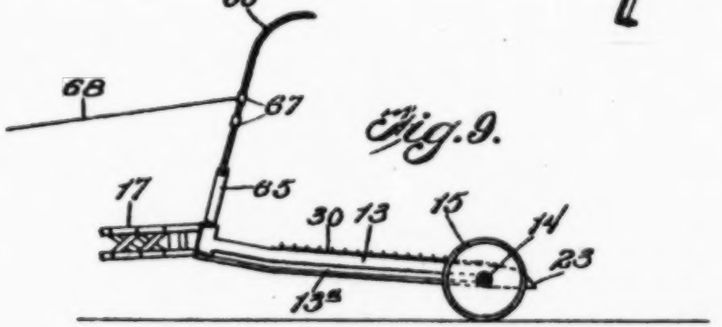

Fig. 9.

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Patented May 17, 1927. 1,628,871

UNITED STATES PATENT OFFICE.

WILLIAM E. BRUCE, OF RANDADO, TEXAS.

FERTILIZER OR STRAW SPREADER.

Application filed October 20, 1925. Serial No. 63,734.

This invention relates to fertilizers or straw spreaders and has for a particular object thereof the provision of a device of this character which may be pushed into a stack of straw or manure to load the same upon a platform which is provided and which may then be withdrawn, carrying with it the load thus placed upon the platform.

A further object of the invention is to provide means for securely clamping the load in position upon the platform which is operable from the seat of the implement.

A further object of the invention is to provide means operable to either load material on the platform or to remove material from the platform in small quantities.

A still further object of the invention is to provide a device of this character having a shiftable axle moving automatically from one end of the platform to the other as the direction of movement of the platform is reversed and so associated with the platform that when the platform is being pushed as, for example, into a straw stack, what is then the forward end of the platform will be dropped in close engagement with the ground so that it will pick up its load cleanly, thus permitting use of the device for gathering scattered manure from stock pens or the like while at the same time when the device is being pulled, the platform is raised out of engagement with the ground so that no undue wear occurs thereon.

A still further object of the invention is to provide means whereby this shiftable axle provides a drive for the loading or unloading mechanism.

Other objects and advantages lie in the details of construction shown in the accompanying drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, in which:—

Figure 1 is a plan view of a fertilizer or straw spreader constructed in accordance with my invention;

Figure 2 is a longitudinal sectional view through one of the teeth of the spreader;

Figure 3 is an enlarged plan view partially in section of one arm and the adjacent tooth showing the manner of providing driving connections for the contents of the teeth;

Figure 4 is a longitudinal sectional view through the arms shown in Figure 3;

Figure 5 is a fragmentary perspective of the bar 58;

Figure 6 is a detail sectional view through the clutch;

Figure 7 is a side elevation showing the positions assumed by the spreader when the same is being pushed and illustrating the shifting of the load engaging hooks;

Figure 8 is a perspective of the load engaging hooks showing the mounting thereof;

Figure 9 is a side elevation of the device showing the positions assumed when being pulled.

Referring now more particularly to the drawings, the numeral 10 generally designates a platform, in the present instance, shown as consisting of a head rail 11 to which are attached a plurality of parallel rearwardly extending teeth 12. From each end of the head rail 11 project rearwardly directed arms 13 paralleling the teeth 12. Each tooth 12 and arm 13 is provided with a longitudinally extending slot 12^a, 13^a, adjacent the lower face thereof. These slots coact for the reception of an axle 14 which is shiftable from one end to the other of the slot. This axle has supporting wheels 15 at the ends thereof and a supporting wheel at one end has associated therewith a bevel gear 16, for a purpose presently to appear.

To the center of the head rail 11 is secured a tongue 17, the outer end of which provides a mounting for a driver's seat 18 and cross arm 19 to the ends of which is secured means for attaching draft animals, generally designated at 20, this means including a doubletree 21 so connected that it may be swung to place the draft animals in between the cross bar 19 and the head rail or beyond the cross bar 19 from the head rail so that the draft animals may be employed to either push or pull the platform. The connections between the tongue 17 and the platform 10 are such that the platform inclines downwardly from the tongue with the result that when the axle is arranged in the ends of the slots 12^a, 13^a next adjacent the head rail, the free ends of the teeth 12 and arms 13 engage the ground and when the axle is at the opposite end of the slots 12^a, 13^a, the entire platform is elevated above the ground and no portion thereof is dragged to cause wear. It will also be noted that the axle 14 will automatically move to the first named end of the slots 12^a, 13^a, when the platform 10 is being pushed and to the last named end of the slots when the platform is being pulled.

Thus, when it is desired to pick up material from the ground, the device is being pushed in front of the team and the arms 13 and teeth 12 are lowered into a position where they may readily and cleanly pick up the load. When, on the contrary, the load is to be transported, the weight of the load is borne by the truck wheels and additional friction, such as would be caused by engagement of the teeth and arms, is eliminated.

Each tooth 12 has its upper portion in the form of a housing, the forward end of which provides a shoe 23 for engagement with the ground. In the rear portion of this shoe, on each tooth is mounted a stub axle 24 upon which is mounted a roller 25, the upper edge of which projects through a slot 26 formed in the upper wall 27 of the tooth. Adjacent their rear ends, a shaft 28 extending transversely of the platform is directed through all of the teeth and in the housing of each tooth has secured thereto a sprocket wheel 28ª, the upper face of which projects through a slot 29 formed in the upper wall of the housing. About each roller 25 and sprocket 29, a toothed sprocket chain 30 is passed.

The shaft 28 is connected by sprocket gearing 31 with the output shaft 32 of the transmission 33. This transmission is secured to one of the arms 13 and has an input shaft 34 projecting into a hollow housing 35 formed in this arm. The input and output shafts 32 and 34 have each a plurality of gears 36, 37, the gears 37 being fast to the shaft 34 while the gears 36 are loose upon the shaft and are selectively lockable by a shiftable spline 38 which is likewise movable to a neutral position.

Within the housing 35, the shaft 34, has secured thereto a bevel gear 39 with opposite sides of which engage bevel gears 40 and 41. The gear 40 is fast to a shaft 42 journaled in the housing 35 and in a shoe 43 forming the forward end of this housing. Within this shoe, the shaft has secured thereto a gear 43ª meshing with a gear 44 on a jack shaft 45 journaled in the shoe and having a bevel gear 46 opposing the forward end of the slot and so positioned that it will be engaged by the gear 16 of the supporting wheel when the axle 14 is at the end of the slot remote from the rail head. The gear 41 is fast to a shaft 47 which is likewise journaled in the housing 35 and this shaft has its rear end projected through the rail head and provided with a second gear 48. The gear 48 meshes with the gear 49 on a jack shaft 50 having a bevel gear 51 meshing with the gear 16 of the supporting or truck wheel 15 when the axle 14 is in the end of the slots 12ª, 13ª, next adjacent the head rail. It will be seen that a means is thus provided for positively driving the chains 30 in either direction and that when the platform is being pushed, the chains will be operated to draw material on to the platform while, when the platform is being pulled, the chains will be operated to discharge material from the platform.

Since the platform 10 inclines rearwardly at all times, it will be obvious that some means of retaining the load upon the platform must be provided. These means include fingers 52, pivoted, as at 53, in a slot 54 formed in each of the teeth and more particularly in the upper surface of the shoe of the teeth. Each finger 52 is in the form of a bell crank lever, one arm of which forms the finger proper and the other arm of which is attached to a link 55 extending rearwardly through the housing 22 and having an upturned rear end 56. The walls of the housing 22 in alignment with these rear ends have formed therein slots 57 through which are directed a bar 58 having a diagonally extending slot 59 for each tooth and through which the upturned end 56 of the link 55 of each tooth is directed.

The upper surface of the bar at the approximate center thereof is formed as a rack 60 and with this rack meshes a pinion 61 mounted upon a shaft 62 extending to the point adjacent the driver's seat and they are provided with means, as at 63, whereby it may be rotated. It will be obvious that by rotating this shaft, the links 55 may be shifted longitudinally and by their shifting will either throw the fingers to a vertical position or to a substantially horizontal position in which latter position, the fingers close the slots 54 so as to prevent entry of dirt and the like into the housing. The bottom of each housing 22 has preferably formed therein an opening 64 through which dirt may escape as it is dragged through the housing by the chains 30. The means for retaining the load further includes vertical standards 65 carried by the head rail 11 and having pivoted thereto a plurality of hooks 66 connected by a cross bar 67 for simultaneous operation by means of a flexible connection 68 extending to a point adjacent the driver's seat.

In the use of the device, assuming the operator desires to pick up a load consisting of a portion of a straw stack, he swings his draft animals to the position between the bar 19 and the head rail 11 so that they are pushing the platform 10. As the platform is moved, its initial movement causes the axle 14 to move to the head rail end of the slots 12ª, 13ª, and the fingers 12 and arms 13 to lower so that their shoes are engaged with the ground to pick up material therefrom. At this time, the hooks 66 are arranged in a substantially vertical position and the fingers 52 are concealed within their slots. As the forward movement of the platform continues, the gear 16 meshing with the gear 51 drives the chains 30 so that their upper runs travel toward the head rails 10 and anything resting upon the upper surface of the fingers will be moved toward the rear end of the fingers. When the device is fully engaged with the stack, the operator manipulates the means 63 to raise the fingers 52 and drops the hooks into the stack so that these two elements act to hold the load in position upon the platform. At the same time, the transmission is placed in neutral so that no movement of the chains 12 takes place tending to cause discharge of load from the platform. Arriving at the point where it is desired to discharge the load, the transmission is placed in proper gear and with the team pulling the platform, the upper runs of the chains will move toward the rear ends of the teeth, discharging material therefrom against resistance of the fingers 52 and of the hooks 66. If it is desired to bodily dump the load which is carried, this may be accomplished by elevating the hooks to disengage them from the load and depressing the fingers 52 to their concealed position.

It will be obvious that the means of distribution or discharge may be altered as is found desirable without in any manner departing from the spirit of my invention and I accordingly do not limit myself to such specific structure except as hereinafter claimed.

I claim:—

1. In a device of the type described, a platform, means for moving the platform in opposite directions and means operated by reversal of movement of the platform for causing one end of the platform to move into or out of engagement with the ground including a wheel supported axle for the platform freely shiftable from one end of the platform to the other thereof.

2. In a device of the type described, a platform, means for moving the platform in opposite directions, means operated by reversal of movement of the platform for causing one end of the platform to move into or out of engagement with the ground including a wheel supported axle for the platform freely shiftable from one end of the platform to the other thereof and load shifting means carried by the platform and adapted to be driven from said axle when the latter is in either of its extreme positions.

3. In a device of the type described, a platform, means for moving the platform in opposite directions, means operated by reversal of movement of the platform for causing one end of the platform to move into or out of engagement with the ground including a wheel supported axle for the platform freely shiftable from one end of the platform to the other thereof and load shifting means carried by the platform adapted to be driven from said axle when the latter is in either of its extreme positions, the driving connections of said axle and load shifting means including means whereby said load shifting means is reversely operated when the axle is at one end of the platform to the direction of operation when the axle is at the opposite end of the platform.

4. In a device of the type described, a platform, means for shifting a load upon the platform toward or away from one end thereof, means for moving the platform in opposite directions and means for driving the load shifting means in a direction opposite to the direction of movement of the platform including a part supporting the platform and operated by reversal of movement of the platform to shift said end of the platform into or out of engagement with the ground.

5. In a device of the type described, a platform, means for shifting a load upon the platform toward or away from one end thereof, means for moving the platform in opposite directions and means for driving the load shifting means in a direction opposite to the direction of movement of the platform including a wheel supported axle for the platform freely shiftable from one end of the platform to the other thereof, said end of the platform when the axle is at one end of the platform being in engagement with the ground and when the axle is at the opposite end of the platform being maintained in spaced relation thereto.

6. In a device of the type described, a platform, means for moving the platform in opposite directions and means operated by reversal of movement of the platform for causing one end of the platform to move into or out of engagement with the ground including a wheel supported axle for the platform freely shiftable from one end of the platform to the other thereof and load shifting means carried by the platform and driven from said axle, the driving connections between said axle and said load shifting means being reversely operated when the axle is at one end of the platform to the direction of operation when the axle is at the opposite end of the platform, said driving connection including a transmission having a neutral point.

7. In a device of the type described, a platform including a plurality of longitudinally extending fingers, a conveyor chain associated with each finger, means for moving the platform in opposite directions, means operated by reversal of movement of the platform for causing one end of the platform to move into or out of engagement with the ground including supporting wheels for the platform and means operated by

movement of the wheels in either direction for operating said conveyor chains.

8. In a device of the type described, a platform, means for shifting a load upon the platform toward or away from one end thereof, means for moving the platform in opposite directions and means for driving the load shifting means in a direction opposite to the direction of movement of the platform including a wheel supported axle for the platform freely shiftable from one end of the platform to the other thereof, said end of the platform when the axle is at one end of the platform being in engagement with the ground and when the axle is at the opposite end of the platform being maintained in spaced relation thereto, said axle, when at opposite ends of the platform being oppositely operatively connected with said load shifting means and means for rendering said connection inoperative.

9. In a device of the type described, a platform, means for shifting a load upon the platform toward or away from one end thereof, means for moving the platform in opposite directions, means for driving the load shifting means in a direction opposite to the direction of movement of the platform including a part supporting the platform and operated by reversal of movement of the platform to shift said end of the platform into or out of engagement with the ground, vertical standards carried by the opposite end of the platform and hooks operatively pivoted to said vertical standards and movable to engage with or disengage from the load carried by the platform.

10. In a device of the type described, a platform, means for moving the platform in opposite directions and means operated by reversal of movement of the first named means for causing one end of the platform to move into or out of engagement with the ground while maintaining the platform in a load supporting position.

In testimony whereof I hereunto affix my signature.

WILLIAM E. BRUCE

SCHILTZ PATENT NO. 3,298,550

10. A mobile machine for transporting haystacks and comprising:

(a) an elongated frame,

(b) drive means for imparting generally longitudinally directed movement to said machine relative to the ground,

(c) an elongated bed assembly extending longitudinally of said frame,

(d) means mounting said bed assembly on said frame for tilting movements between an inclined position wherein the bed assembly is adapted for movement with said machine and under a haystack for loading and unloading of a haystack onto said bed assembly, and a horizontal load transporting position,

(e) said bed assembly including a plurality of laterally spaced longitudinally extending support members,

(f) a plurality of laterally spaced endless conveyor elements one each mounted on a different one of at least some of said support members, and each having upper and lower flights, the upper flights overlying their respective support members and being adapted to carry hay onto and off of said bed assembly as it is moved under a stack,

THE BRUCE PATENT NO. 1,628,871

The structure is described as one for loading, transporting and unloading, straw, manure and similar forage. (Appendix D, A-408)*

(a) This structure is described in the Bruce patent as a platform 10 consisting of a headrail 11 to which are attached a pluality of parallel rearwardly extending arms 13 on the outer portions of the mechanism. (A-408)

(b) The draft animals connected to the machine form the response to Paragraph (b) for providing the movement to the machine relative to the ground. (A-409)

(c) The bed assembly is formed of a plurality of parallel rearwardly extending teeth 12. (A-410)

(d) The *exact* tilting mechanism referred to was not found but elements which provide the same purpose and function are found in the axle 14 in Fig. 2, the longitudinal slot labeled 12a where the wheels shown in Fig. 1 will be in the position for loading with teeth 12 in contact with the ground and when the mechanism is in the transport mode of operation, the axle 14 will move in slot 12a to the position near the end of the teeth. (A-410, 411) (See also Fig. 7, Appendix E)

(e) The bed assembly is further defined as including the teeth 12 and they are described as a plurality of parallel rearwardly extending teeth 12 in the patent. (A-411)

(f) In Fig. 2 of the Bruce patent, the chain 30 on each of the teeth forms a plurality of conveyors that are mounted on sprockets at each end of the teeth and they are driven through a sprocket 28a, the driving shaft being 28 and also incorporating an idler sprocket 25. (A-412-414)

*Each reference below is to Appendix D unless otherwise indicated.

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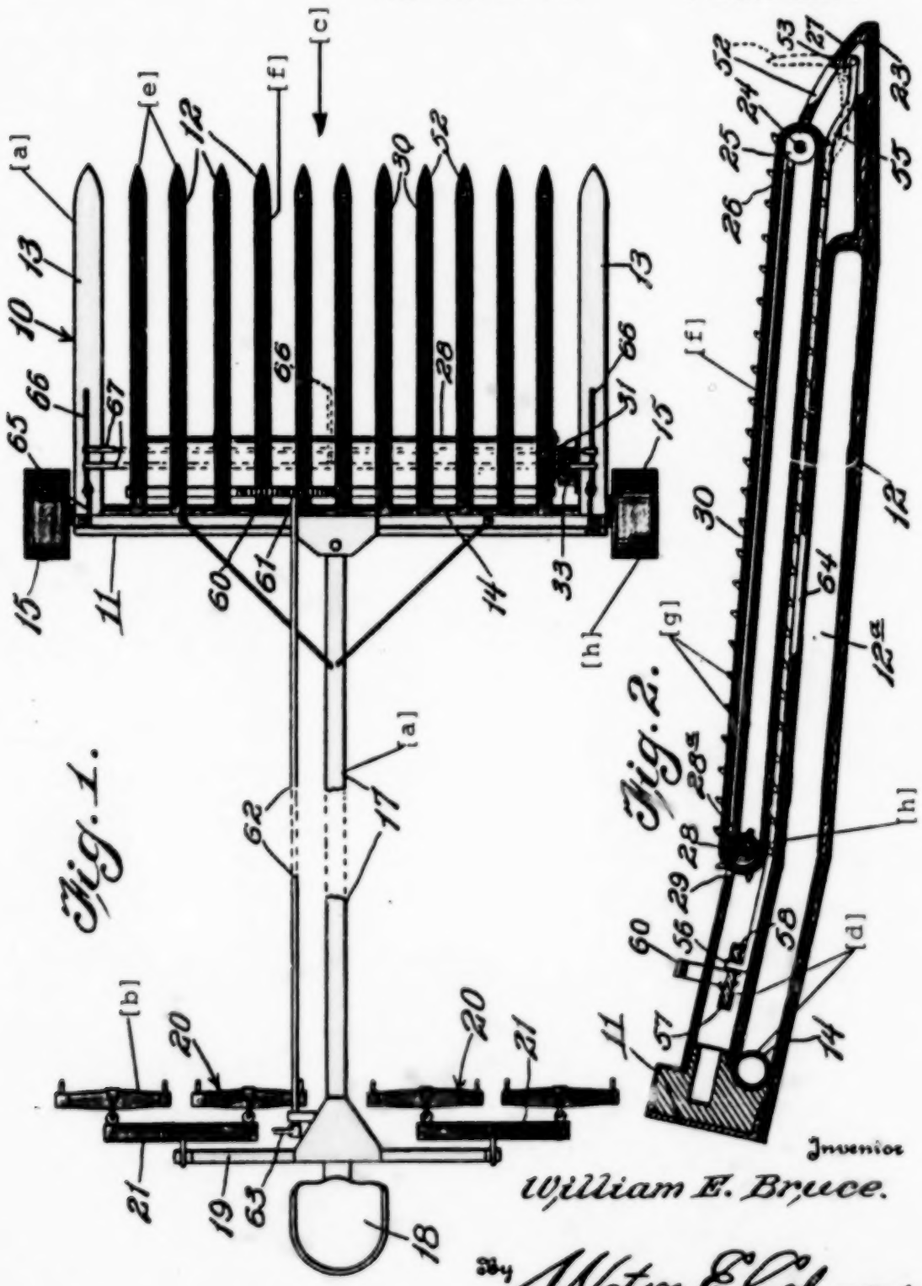

Fig. 1.

Fig. 2.

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FERTILIZER OR STRAW SPREADER

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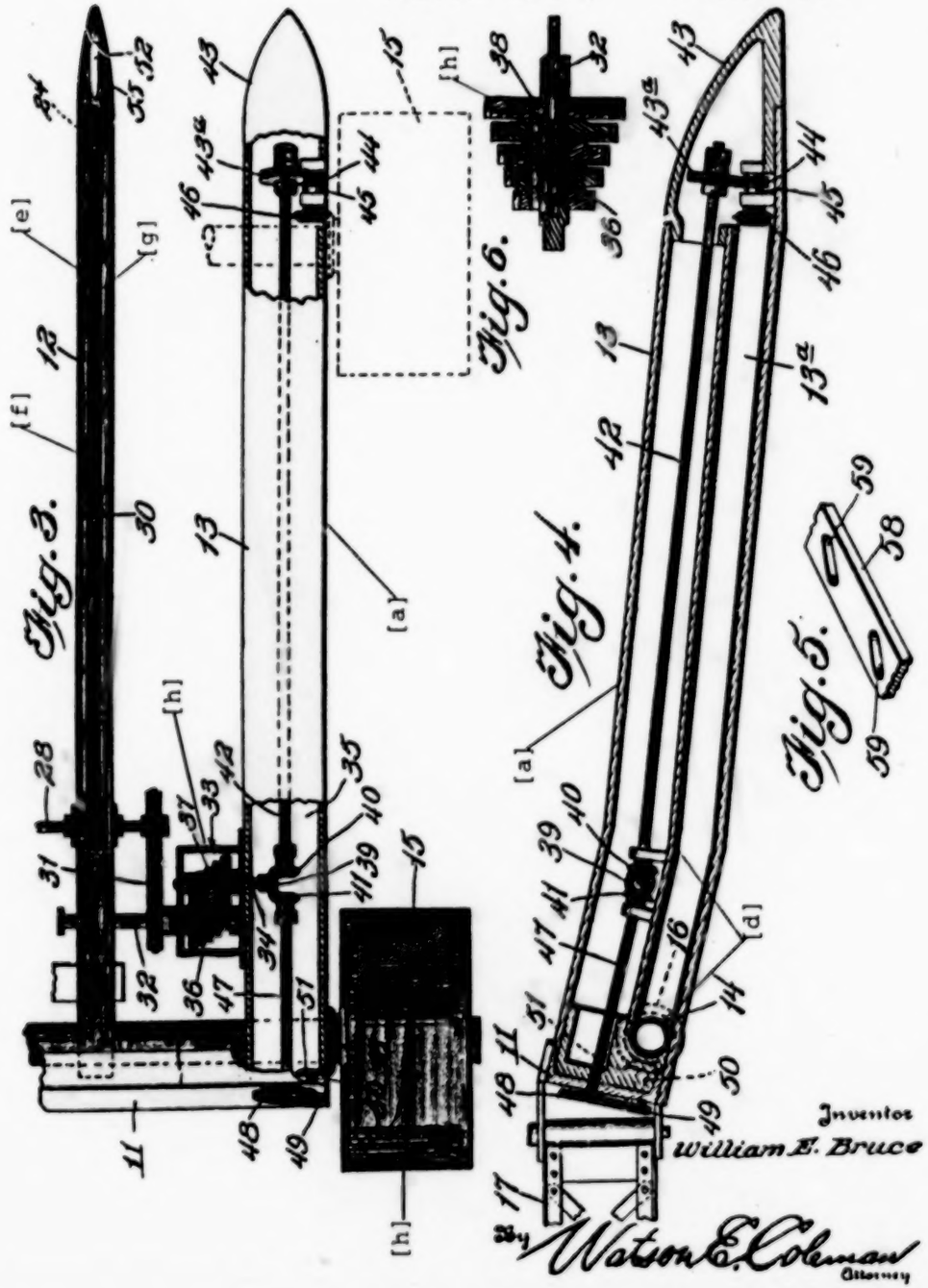

Fig. 3.

Fig. 6.

Fig. 4.

Fig. 5.

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SCHILTZ PATENT NO. 3,298,550

(g) a plurality of longitudinally spaced hay-engaging teeth on each of said conveyor elements,

(h) and a second drive means operative to impart concerted movement to the inclined upper flights of said conveyor elements in a direction opposite to the direction imparted to said machine by said first mentioned drive means and at a rate on the incline such that said flights have a horizontal component of movement generally equal to the rate of machine movement.

THE BRUCE PATENT NO. 1,628,871

(g) There are teeth or lugs on the chain, shown in Figs. 2 and 3. (A-414) [The specification of the patent also identifies the teeth, Appendix E, p. 2, 1n 25.]

(h) In the loading position, wheel 15 has a bevel gear 16 which meshes with a bevel gear 50 which is mounted on a shaft that drives a spur gear 49 which meshes with a large spur gear 48 to drive shaft 47. Shaft 47 (Fig. 4) drives a bevel gear 41 that is meshed with another bevel gear 39 to drive shaft 34 that has connected to it a series of gears 37 that operate in conjunction with the shaft which is solidly connected. An equal number of gears 36 mesh with gears 37 but each operate independently and are not connected to the shaft until a sliding rod with a key in a slot moves to engage one of the gears. That is, any one of the five gears 36 may be connected through the key 38 (Fig. 6) thereby permitting the operator to select any speed with this type of transmission. Upon being engaged, that shaft turns a sprocket and chain 31 which in turn drive shaft 28 to drive all the sprockets for the endless conveyors. (A-415)

In the transport position, the transmission is placed in neutral and the chains are not operated. Appendix E, 1n. 10-14)

In the unloading position, the wheels 15 would be in the position shown in Fig. 3 where bevel gear 16 engages bevel gear 46 to turn shaft 45, operating a spur gear 44 which in turn meshes with a spur gear 43a. Bevel gear 40 then drives bevel gear 39 in the opposite direction to provide the proper direction of movement for the chains. The transmission provides five different speeds so that the operator may select a proper speed corresponding to the movement of the machine for unloading the stack. All of the chains labeled 30 are driven in the same direction at the same time and at relatively the same speed because they are connected with shaft 28. (A-414-417)

CROSS-EXAMINATION BY MR. GOULD:

Q. Well does the patent disclose any other position for unloading? A. Well the drive is arranged in such a way that it could be if the wheels stay in this position.

Q. Don't—as disclosed in the patent, don't the wheels have to be in the position of Fig. 9 in order to drive the chains for unloading? A. No.

Q. As shown in the patent? A. The provision is there that if the wheels are in the loading position and the unit moves in the other direction, this automatically, as that wheel is reversed, will reverse the movement of the chains so he is going ahead, the wheels are rolling. In other words, he is going to the right, the wheels are rolling and the chain is pulling the material on. Now, if the wheels stayed in the same position and he was backing up the chains would reverse, right.

Q. Except it—when we back up—when he is backing up, the chains are going towards a—toward the front of the bed, aren't they? A. Trying to unload. (T. 756-757)

* * * * *

Q. And actually, the patent doesn't describe any other condition for unloading, does it? A. It doesn't describe it, but it shows it. I mean, the elements are there. (T. 759)